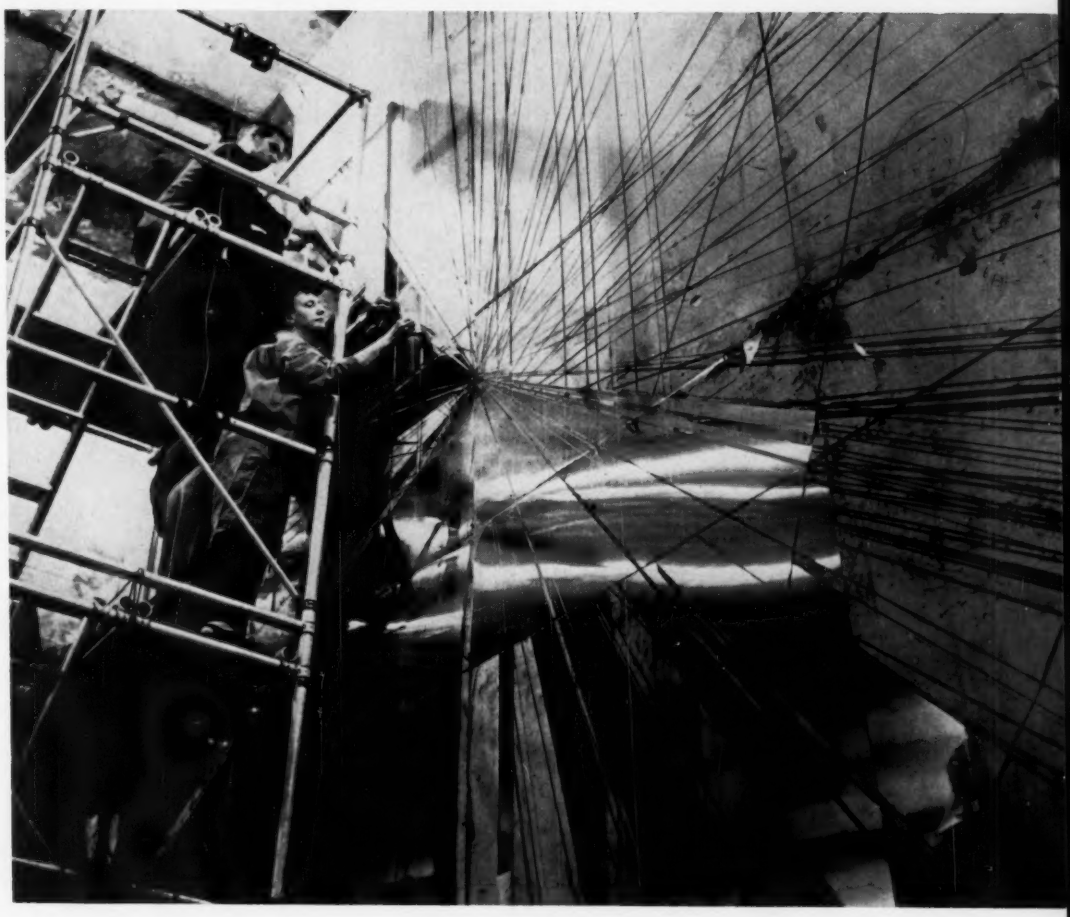
VOL. 160 — NO. 9

MARCH 4, 1961

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY



Artist Buell Mullen and her assistant cut into stainless steel with sharp engraving tool to inscribe the design for a huge mural in Western Electric's new building in New York City. Mrs. Mullen's design will suggest the sweep of communication across time and space. See story, page 40.

Circulation This Issue
14,077 of Which
13,495 Is Paid

MANAGEMENT · PLANT · TRAFFIC · COMMERCIAL · LEGAL · ACCOUNTING

Published every week on Saturday by TELEPHONY PUBLISHING CORP., 608 S. Dearborn St., Chicago 5, Ill. Subscription $4.50 per year. Entered as second class matter at the Post Office at Chicago, Ill., under the act of Mar. 3, 1879.

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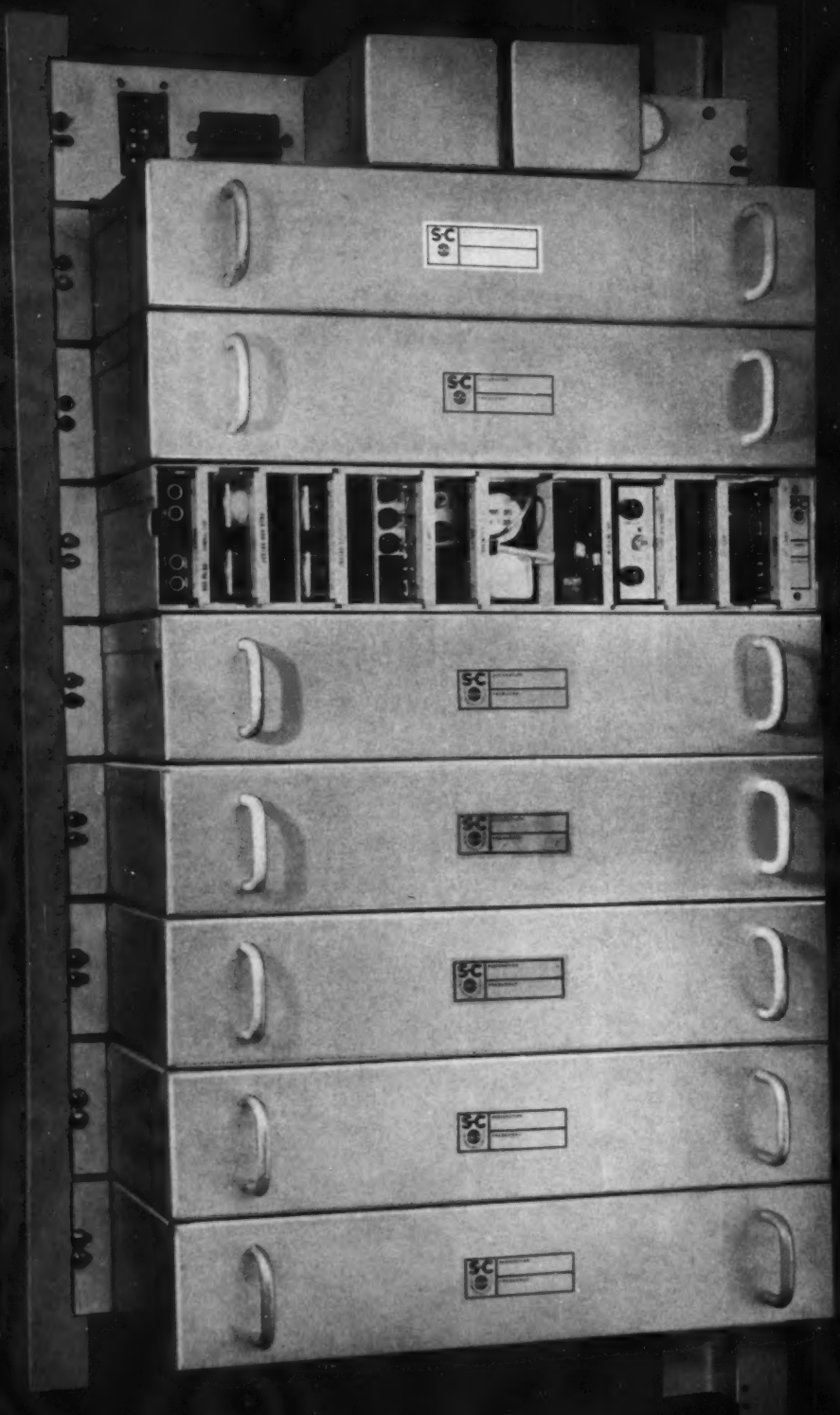

Reliable . . . proved in use: with well over 1,000 channels in operation, Stromberg-Carlson Subscriber and Trunk Carrier Systems are thoroughly proved-in by the most rugged test of all . . . actual service in the field in operating companies from coast to coast since 1956.

The 561 Subscriber Carrier System is your best buy for low-cost rural expansion of subscriber service.

The 565 Trunk Carrier System is your top choice for economical short-haul toll service between central offices.

Look at the Advantages

Supreme flexibility: all units are of the plug-in type. And you can add and remove channels in any order. No need to rearrange or disturb other channels working on the same line.

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Easy conversion: if you already have our 5-channel systems, addition of channels 6, 7 and 8 is easily done. No increase in common equipment!

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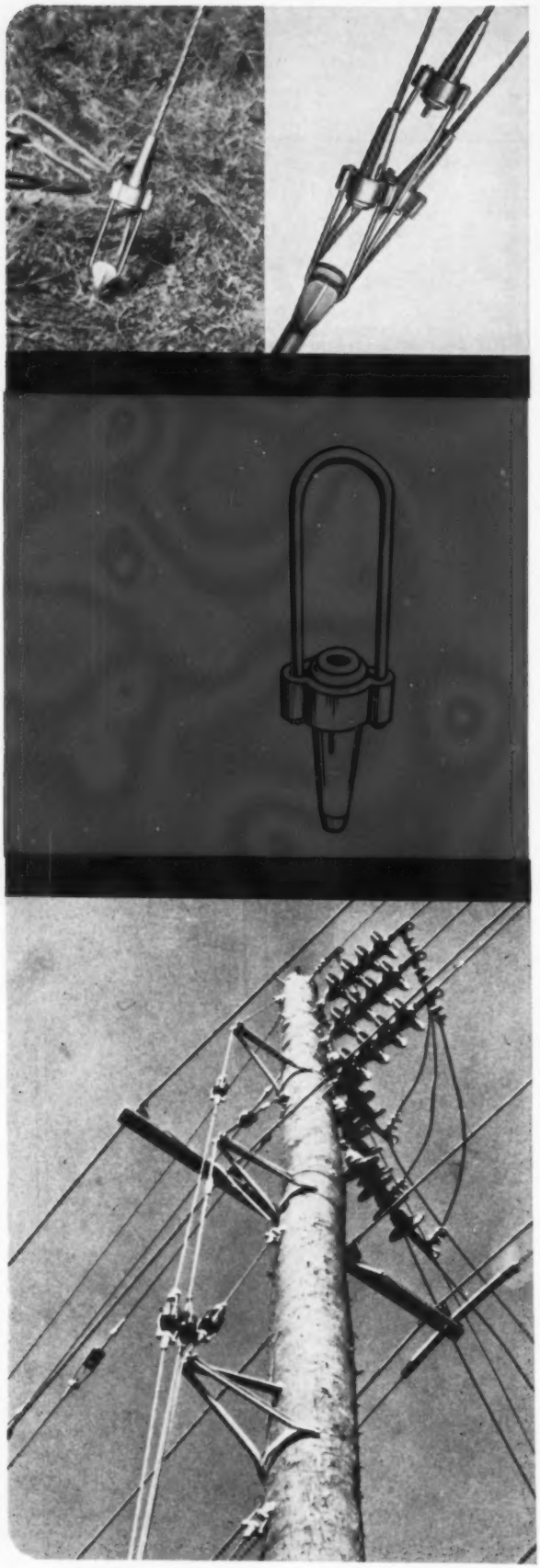

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ONE-MAN *ability*

A one man "crew" can complete a down guy easier, faster and safer than with any other method. Strandvise is a "natural" even for EHS strand.

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No precision pre-cutting. No markers to locate and line up. No size color codes to remember.

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When you choose a dial system, consider the cost of the exchange building, as well as the cost of the switching equipment. Leich's Dial System is not only economical to install and maintain, but also saves you money by occupying a minimum of space.

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A Leich sales engineer will be glad to show you how the Leich Dial System saves you money. Write today – without obligation.

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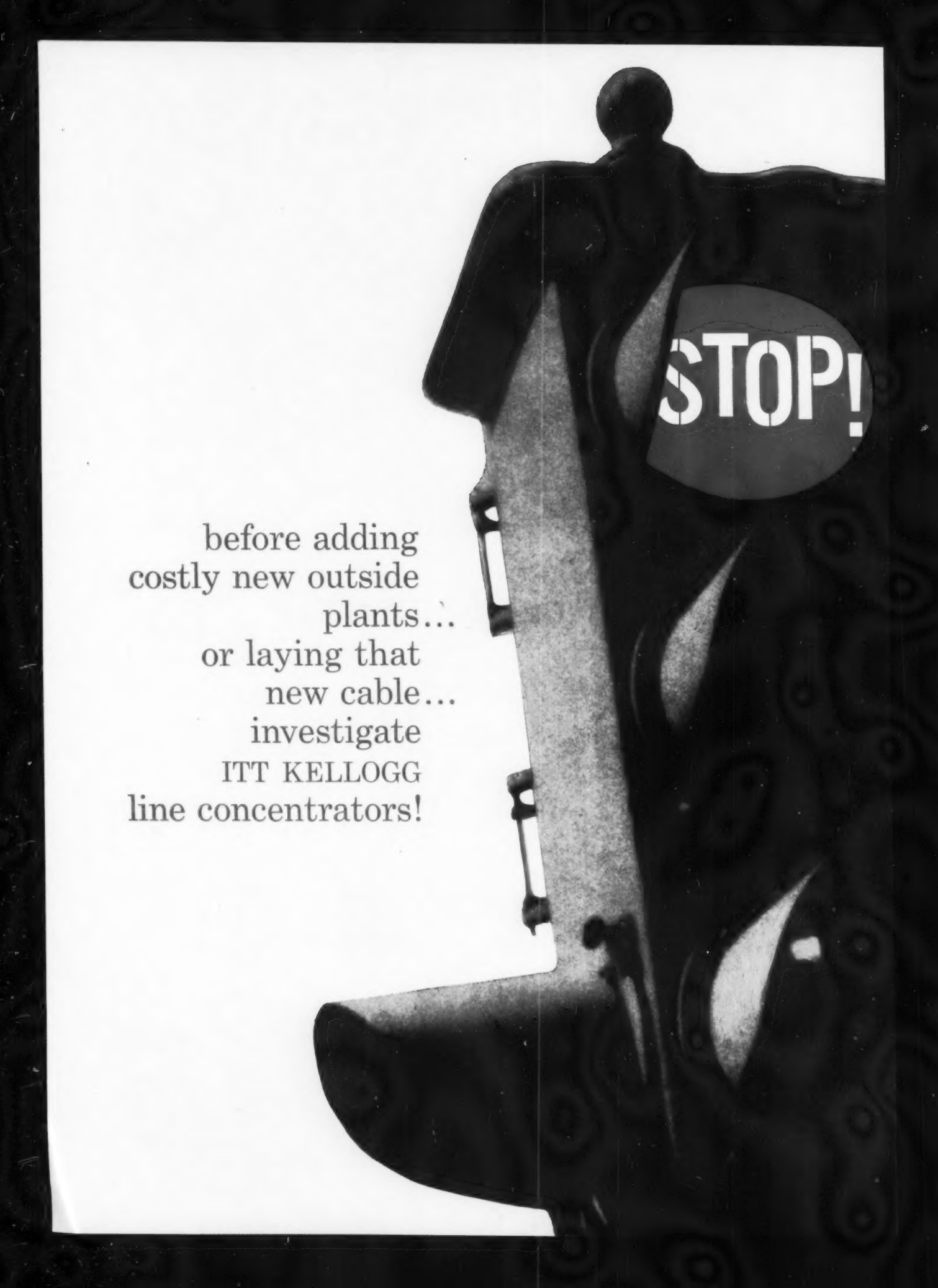

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investigate
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meet new service demands quickly, economically, with cost-cutting ITT Kellogg line concentrators!

An ITT Kellogg Line Concentrator can be an easier, more economical, *better* way of supplying high grade service to that growing surburban community • new housing development • resort area military installation • outlying factory • hotel • motel • trailer park • fair ground, etc.

Meet new service demands fast—because an ITT Kellogg Line Concentrator—one compact unit at subscriber area, one in central office—requires little more than jumpering and can be put into full operation in days—by your own crew! You meet new service demands economically—because the entire cost of a Line Concentrator is *less* than the cost of 1 mile of 19 ga. 26 pair cable!

Here's what it does: Invariably, present cable pairs nearest your new service area) are probably in full use *less* than 10% of the time. The L-52 works on a line sharing principle . . . allows you to utilize assigned (though idle) lines.

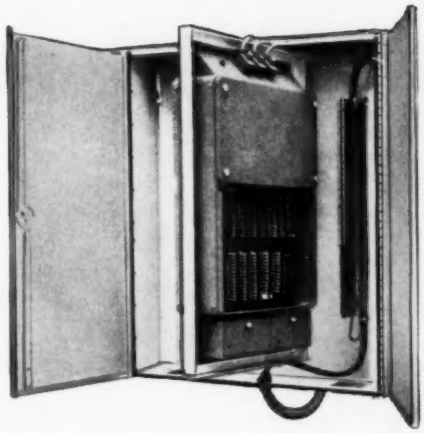
These two popular models fill most needs . . .

Model L-52B 52 lines derived from 12 trunks and 2 control pairs.

Model L-52D 104 lines derived from 20 trunks and 2 control pairs.

Both models operate on loop resistances up to 1700 ohms with 48 VDC, or up to 2400 ohms with 60 VDC.

For complete details and technical information, or an appraisal of your Line Concentrator requirements, see your local ITT Kellogg Representative or call or write the ITT Kellogg Regional Office nearest you.



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FLASHES AND PLUGS

SLEUTH AT THE SWITCHBOARD. A Chillicothe, Mo., chiropractor, was held up by two men at his office recently and left with a tape strap around his throat and ankles, hands and feet bound, eyes taped over, a handkerchief stuffed in his mouth and taped over.

In spite of these impediments, he crawled like a caterpillar to his desk, knocked his telephone handset off the cradle, and twisted into a position where he could dial the operator.

When Southwestern Bell Telephone Co. operator Letha Engleman answered, all she heard were muffled sounds from the gagged man, but it was obvious that someone needed help and was unable to speak.

To find out where he was, she began naming streets in Chillicothe. To each one the victim replied "Uh-uh" until she came to "Washington." This time he said "Uh-huh."

From then on, Southwestern Telephone *News* commented, it was just a matter of determining the street number by a process of elimination. Finally Letha had worked out the exact address, and sent police there to free the helpless man.

•

NOT THE DEPTH BUT THE FIT. Out Nebraska way, Lincoln Telephone & Telegraph Co. *News* reports, tall Tom Goldenstein of engineering and compact-sized Joe Gray, his colleague, were working north of Donovan, making a survey in connection with a road change and resulting telephone line move.

Part of the course of the revised route was a crossing of the Platte river, sometimes referred to locally as "a mile wide and a foot deep."

Tom waded confidently into the stream. Somewhat cautiously, Joe called out to inquire the depth.

"Come on across," replied Tom. "The water is only knee deep."

In waded Joe, only to find that knee deep on Tom was considerably deeper on him.

"I almost drowned!" he lamented in re-telling the experience.

In the future, we feel sure, Joe will request all water depth estimates to be reported in feet and inches instead of anatomy.

•

INTERPHONE PROSPECT. A young housewife and a small boy who lived in the house next door were very good friends. The four-year-old came to visit her at about the same time each morning.

One day, she decided to play a joke on her little friend, and when the door bell rang, she got down on her hands and knees. As she opened the door, she peered around it, growling "Woof-woof" . . . and watched, spellbound, as a salesman beat a hasty retreat down the front walk.

CHANGE OF ADDRESS

Please notify your local postmaster and the Circulation Department of TELEPHONY of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

1901 — 60 years — 1961

March 4, 1961

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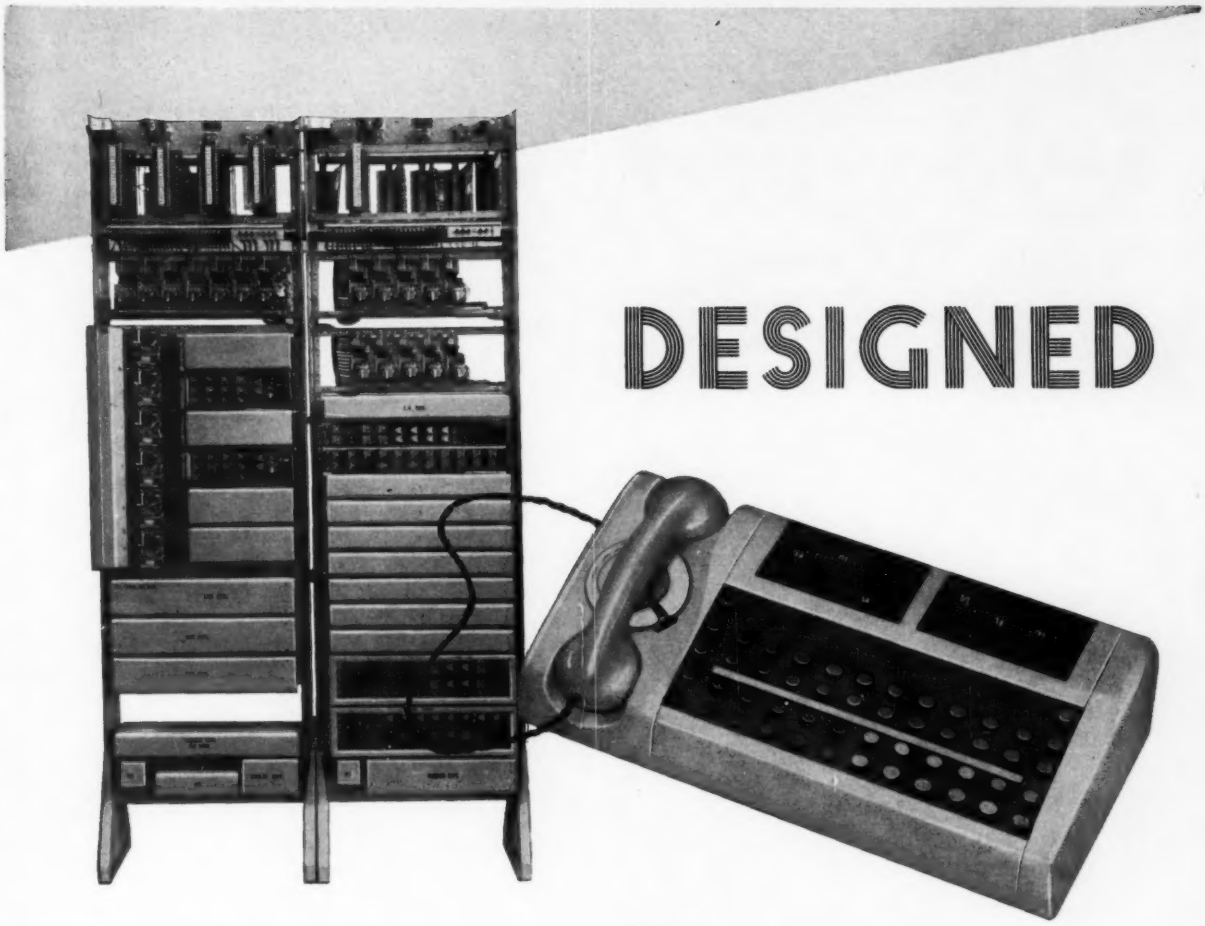

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AND ATTENDANT'S SET

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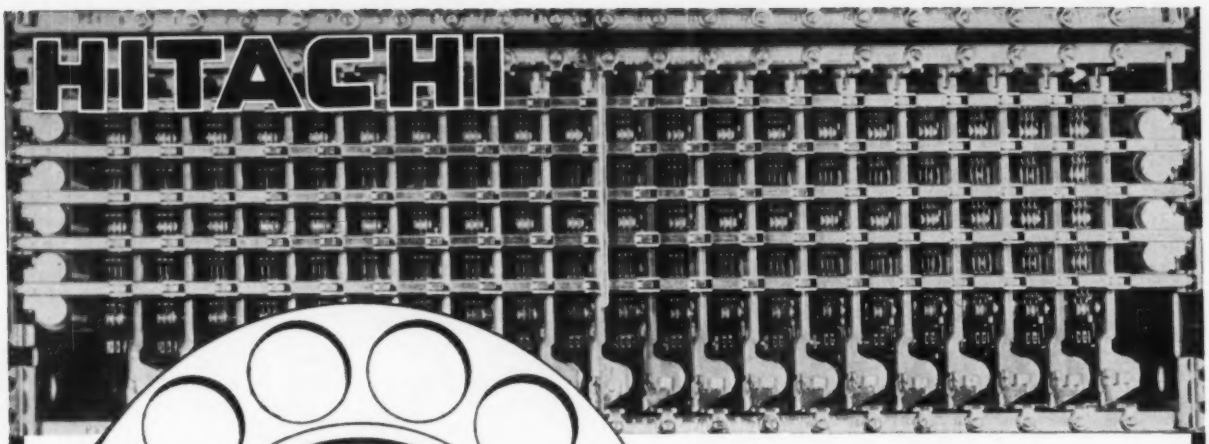

For communication systems, call Hitachi

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Electric Wire and Cable

Extensive Hitachi experience with communications systems is reflected in the handsome Type HA-6 telephone set. Its light, compact and sturdy body is tough enough to withstand the shock of being accidentally dropped to the floor. Other outstanding features include high-fidelity transmission and reception, dust-proofed ratchet for ever-smooth dialling action, and clear and commanding bell-tone.

Today's telephone communications authorities are now employing the Crossbar System Automatic Telephone Switchboards in addition to the time-proven "step-by-step" Strowger System. They are finding that the Crossbar System offers many advanced facilities, fewer maintenance problems, minimized failures and longer service life, and that these features are making it ideal for unattended operations. Hitachi has devoted particular attention to the development of the Crossbar System, and consignees continue to report gratifying operating results.

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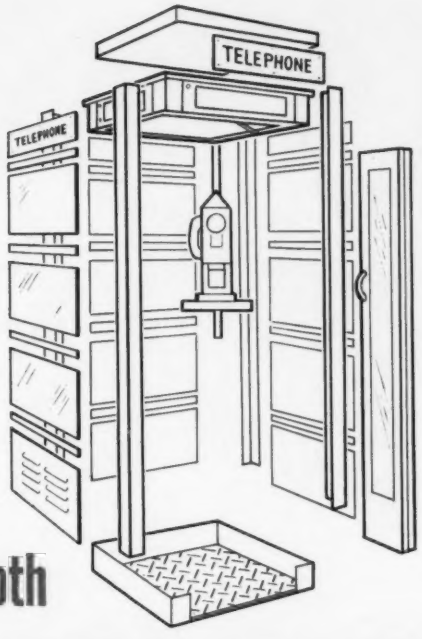


SHERRON phone booth STANDARDIZATION

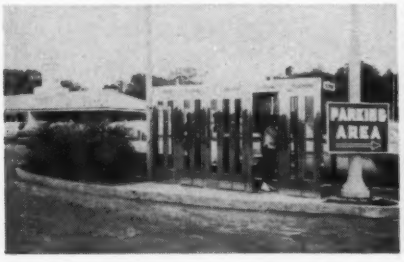
SERVES TELEPHONE COMPANIES' FIELD SERVICE PROGRAMS

Field repair is now an established program of more and more telephone companies... thanks to Sherron phone booth standardization.

The simple substitution of one Sherron part for another makes any repair an on-the-spot job. Top to bottom, from corner posts to panels, every element of Sherron steel booths is readily interchangeable.

The above sketch of a disassembled Sherron steel booth shows how parts may be replaced, anywhere, any time. (And replacement parts are always available from Sherron stock).

No need to haul the booth back to the shop with resultant loss of paystation revenue. Avoidable costs and delays are eliminated, insuring more efficient, more effective field service programs.



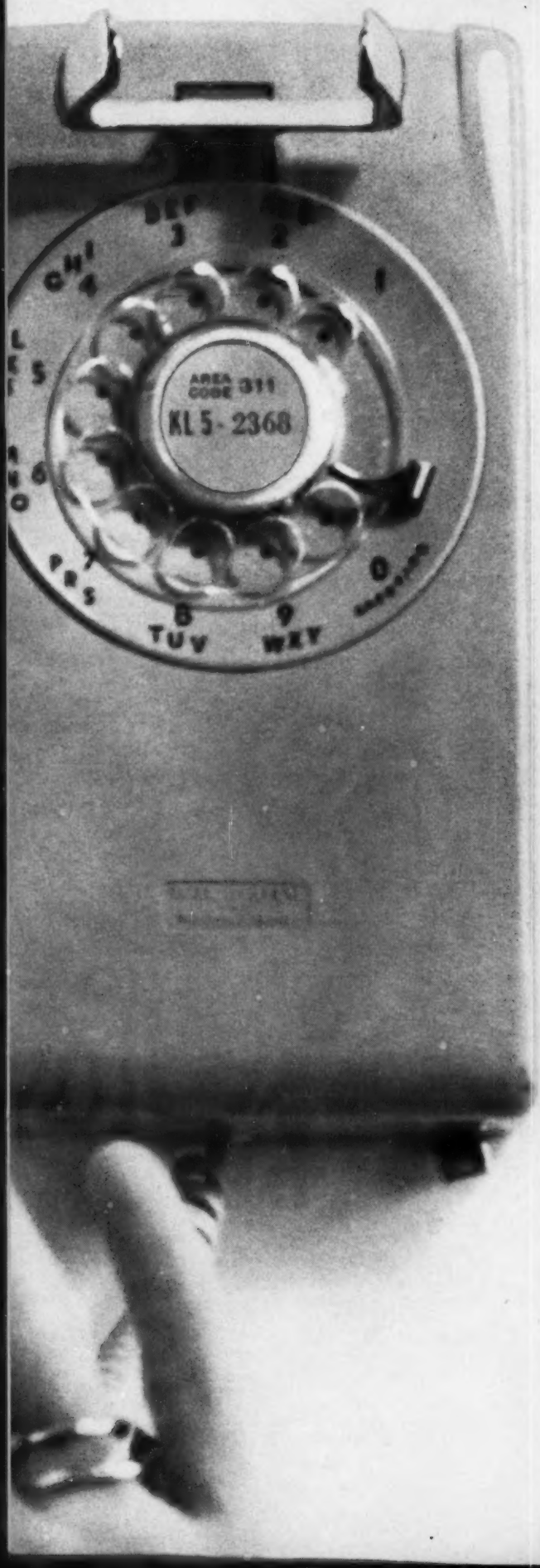
SEE OUR CATALOG IN SWEET'S

INDEPENDENT

Sherron ACOUSTIC T SEE-THRU STEEL-STAINLESS STEEL OUTDOOR AND INDOOR TELEPHONE BOOTHS

There's a Sherron booth for every location and budget in either zinc coated or stainless steel

SHERRON METALLIC CORP., 1201 FLUSHING AVE., BROOKLYN 37, N.Y.



"Not for you, darling... this is Jane"

That's the headline, and here's the illustration, of a current Bell System national ad on the telephone's value.

The purpose of the ad is to change some husbandly minds on the subject of their wives' telephoning.

We submit that such talk on the phone is *not* mere chatter. Most ladies exchange vast amounts of useful, practical information by phone—information that often directly benefits the head of the house.

We hope the ad will prompt millions of men to pause, reflect and ask themselves some questions. For example:

Come to think of it, where did Anne find out about that terrific freezer sale?

For that matter, where did her new cake recipe come from?

That swell book I'm reading—how'd she hear of it?

Is it true, as she says, that the phone is one of her biggest helps in getting things done and keeping track of what's going on?

And what about the reaction of our women readers? We think the ad will bring every one of them to her feet cheering.

BELL
TELEPHONE
SYSTEM

Let our "Revenue Men" show you

THE NEW POTENTIALS OF DIRECTORY REVENUE

Take a man like

Dick Gossett

Dick is one of our "Revenue Men" in San Francisco, California.

You'll find Dick Gossett a straightforward, hardworking man with plenty of experience packed into his 36 years. The instant you meet him, you'll know he's the kind you can count on for a job well done.

Like most young men getting out of school in the early 1940's, Dick's first job was already cut out for him. He joined the U. S. Navy in 1943, and served three years as a radioman on our ships at sea.

It was in 1954 that Dick joined General Telephone Directory Company as a Local Sales Representative in a unit of our Long Beach Division. He was promoted to a Unit Sales Supervisor in our San Francisco Division during 1959.

The Gossett family numbers four: Dick, his wife Marjorie, and their two daughters, Janet, 8, and Sheri, 6. Two of Dick's main outside interests are turning out some mean carpentry work, and turning in some mean golf scores (mid-eighties bracket).

Dick is typical of the "Revenue Men" who work for General Telephone Directory Company and for you. And they all have one thing in common—they are an asset to any community in which they live.

Are you keeping pace with the trend of increased directory revenue? The potential is enormous. You can't afford *not* to keep pace.

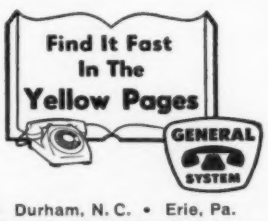
The revenue you earn from a well-sold, well-published directory can give you the highest net profit of any service you sell. Little or no expense is charged against it. And directory profits can make a hefty contribution to total net earnings.

Our "Revenue Men" are trained to help you exploit the rich potential of directory revenue. Backed by our Complete Directory Service Plan, they work with market-tested procedures to tap every source of revenue: local, regional and national.

May we show you a plan tailored to fit your needs? No obligation, of course. Just call or write.

GENERAL TELEPHONE DIRECTORY COMPANY

1800 Oakton Boulevard
Des Plaines, Illinois
VAnderbilt 7-6111



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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR
AND EDITOR, PUBLIC UTILITIES FORTNIGHTLY

FCC approves Bell System's Telpak Plan. . . . System companies begin filing intrastate tariffs for Telpak. ICC voluntarily puts into effect drastic changes in procedure recommended earlier. FCC authorizes start of pay-TV. Phonetic typewriter introduced. Fracas in House Rules Committee.

LAST MONTH, at the time of its first filing with the Federal Communications Commission, the announcement was made of the inauguration of the Bell System's Telpak, the so-called "electronic highway" which provides a flexible and versatile broad-band communications service for a variety of special services in addition to telephone voice channels. On Feb. 15 these tariff filings became effective. This plan will enable a good many more people to get communications at a lower cost and will step up the productivity of the communications industry as a component part of the national economy.

Readers of this department are doubtless already aware that Telpak—with its four classifications—will permit such varied use as telephone, telegraph, facsimile, teletypewriter, data transmission, telemetering, and a specialized variety of other transmitted signals. The four classifications—labeled A, B, C, and D—range in capacity from 12-voice channels (type A) to approximately 240-voice channels (type D).

It is available on a round-the-clock, one-month-minimum basis. The new service is intended to give large business and government communication customers a choice between common carrier services provided by the telephone company and private (noncommon carrier) microwave systems. The service can either move in one direction or simultaneously in both directions, between designated transmission points.

The Bell System has already filed intrastate tariffs for Telpak in a number of states, including New York and Michigan, and the number is expected to be expanded steadily as demand for the service grows. The FCC authorization extends only to interstate services. The rates for Telpak depend on which of the four types the customer elects to patronize. For Telpak A—a 12-voice channel—the charge is $15 a month per airline mile. Telpak B (24-voice channels) costs $20; Telpak C (60-voice), $25; and Telpak D (240-voice), $45. Terminal charges depend on terminal equipment used: $15 per telephone, $60 per telephotograph, and so forth. Telpak D1 is suitable for high-speed magnetic tape transmission at a somewhat higher charge, starting at $100.

Manufacturers and suppliers of so-called private microwave systems, as well as the telephone companies, welcome Telpak as a valuable addition to the available public communications services. One of the advantages of Telpak business will be, of course, to meet private microwave system competition. Private microwave suppliers, however, point out that private systems will still offer certain price advantages to qualified users in addition to flexibility in usage. There is still an obstacle faced by private systems because they do not as yet have the right to interconnection with common carrier telephone systems. This is a matter which has been taken up with the FCC.

ICC Voluntary "Reforms"

It would be unfair to say that recent drastic changes in procedure put into effect by the Interstate Commerce Commission were the direct result of criticism of the ICC and other federal regulatory commissions by the Kennedy administration adviser James M. Landis. As a matter of fact, special complaints about delays and inefficient operations within the ICC had been made in a management survey conducted by the well-known firm of management consultants Booz, Allen & Hamilton, early last year. That survey had been made at the request of the Budget Bureau of the Eisenhower administration.

But it is inescapable that the voluntary "reforms," if that is the proper word, will be charged, in part at least, to the criticism contained in the Landis report. Aside from who is responsible, however, the very fact that such changes can be worked out, voluntarily, within the regulatory commission's own framework or household, so to speak, and without any special statutory changes, is very interesting.

It could be that the ICC has set an example, in broad outline at least, which other regulatory commissions might profitably observe. And that certainly goes for the Federal Communications Commission, with its jurisdiction over the telephone and telegraph industries, and having been a very conspicuous target of criticism in the Landis report.

Just what did the ICC do to straighten up its own affairs without outside help? Well, to make a long story short, it has in less than two months made most of the major changes that have been urged upon it by various critics, in one form or other, for several years.

We must bear in mind, of course,

that the ICC is the oldest, the largest, and, therefore, the one federal regulatory commission likely to be most resistant to controversial changes in its organization and procedures. Yet, when the chips were down, the ICC moved vigorously and may, by such prompt voluntary action, avoid more heavy-handed, drastic, and possibly ill-advised overhauling by congressional statutes.

The ICC is largest not only in the number of employes but also in its membership—11 members. It is the only commission which still has the old-fashioned "rotating" system whereby individual commissioners take turns at being chairman every year.

The ICC's voluntary change program started early in January with the announcement that the right of appeal to the full commission, from the decisions of hearing examiners and employe boards, would be limited to "issues of general transportation importance." "Commissioners thus," the ICC noted, "will be able to devote more time to the disposition of cases which . . . affect the broad public interest."

About a fortnight after that, the commission announced the next step—further delegation of authority to staff members to give the commissioners more time for matters of general importance. Early in February the ICC set up three additional employe boards. "Creation of these boards," ICC chairman Hutchinson said, "will free the commission, its divisions, or individual commissioners from annually considering some 2,000 matters which previously would have required their action."

Three days later the ICC announced what it described as "a sweeping reorganization to strengthen the office of the chairman and create the office of vice chairman." The commission said "the plan re-emphasizes that the chairman is the executive head of the commission, responsible to the commission for the executive and administrative functions of the commission."

Late last month the ICC took one more and probably the final step. It changed its opinion-writing procedures to give the responsibility for each of its opinions to an individual commissioner. The anonymity of its opinions was severely criticized by the Landis report. "Opinions of the Interstate Commerce Commission," said Landis, "are presently in the poorest category of all administrative agency opinions. Their source is unknown and the practice has grown up of parsimony in discussing the applicable law in making a determination."

Naturally the ICC would not care to admit that all these changes are the direct result of criticisms by Landis and others and that, perhaps, the agency moved so quickly partly to ward off reorganizations forced upon it by Congress. But whatever the reasons for the ICC's new found ability to act almost with the speed of a jet airplane, Landis as well as other critics of the agency are said to be happy over the results.

In a recent speech before the Federal Bar Association in Washington, D. C., Landis cited some of the ICC's changes as examples of "gains that have already been made" in improving the regulatory process.

Convention Calendar
1961

Association	*Date*	*City*	*Hotel*
Texas	Mar. 12, 13 and 14	Houston	Rice
Iowa	Mar. 23 and 24	Des Moines	Savery
Nebraska	Apr. 5 and 6	Lincoln	Cornhusker
Mississippi	Apr. 17	Unannounced	Unannounced
Ohio	Apr. 18 and 19	Columbus	Deshler Hilton
Wisconsin	May 2 and 3	Milwaukee	Plankinton House
Indiana	May 10 and 11	Indianapolis	Claypool
Illinois	May 17, 18 and 19	Peoria	Pere Marquette
Kansas-Missouri*	May 22 and 23	Kansas City, Mo.	Continental
Pennsylvania	June 5, 6 and 7	Pocono Manor	Pocono Manor Inn
Washington-Oregon*	June 15 and 16	Victoria, B. C.	Empress
New York	June 19, 20 and 21	Schroon Lake	Scaroon Manor
California	June 26, 27, 28, 29 and 30	Honolulu, Hawaii	Hawaiian Village
Alaska	Aug. 21, 22 and 23	Palmer	Unannounced
Tennessee	Sept. 6 and 7	Nashville	Hermitage
Arkansas	Sept. 11 and 12	Hot Springs	Arlington
Rocky Mountain	Sept. 13, 14 and 15	Boise, Ida.	Owyhee
Michigan	Sept. 19, 20 and 21	Grand Rapids	Pantlind
Nevada	Sept. 19, 20 and 21	Elko	Stockmen's
USITA	Oct. 8, 9, 10 and 11	Chicago	Conrad Hilton
South Carolina	Oct. 23 and 24	Clemson	Clemson House
Virginia	Oct. 26 and 27	Roanoke	Roanoke
Oklahoma	Nov. 8 and 9	Skirvin	Oklahoma City
Florida	Nov. 26, 27 and 28	Miami Beach	The Carillon
North Carolina	Dec. 4 and 5	Pinehurst	Carolina

*Joint meeting

Pay-TV Starts in Hartford

On Feb. 24 the FCC formally authorized the nation's first full-scale try-out of pay television at Hartford, Conn. The action had been expected for several weeks. The commission gave final approval to plans to conduct a 10-million-dollar three-year test of pay-TV. The experiment is expected to begin in about six months. The first major trial of subscription-TV will be conducted by Hartford Phonevision, created for the purpose by RKO General, Inc. A Zenith Corp. decoding system will be used.

Hartford Phonevision has purchased Hartford TV Station WHCT for the experiment. The station will show about 40 hours a week of pay programs and 30 additional hours of "conventional free" TV fare. First-run films will dominate the pay programs, but stage, music, educational, and sports programs also will be offered.

The cost of the programs will range from about 25 cents to $3.50, with the majority running from about 75 cents to $1.50. The charge for installing a Zenith decoder, which also includes a device to add up the charges, will be from $7.50 to $10. The Hartford experiment was bitterly opposed by many broadcasters and movie theater owners in hearings before the FCC last October.

Paramount Pictures is running a test of closed circuit paid TV at Toronto, Canada. This has met little opposition because it is carried on telephone lines. There have been other closed circuit tests of pay TV in the United States. But the Hartford experiment will be

(Continued on page 42)

A Test Panel for Private Line Circuits

By D. G. PLASKETT*

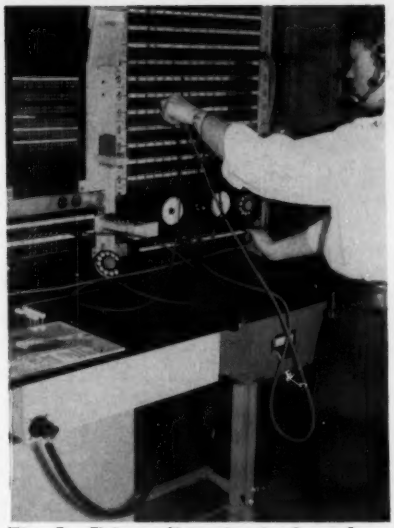

Fig. 1. Private line circuits have been brought together on one jack field to make tests easier to plan and test points easier to locate.

AN IMAGINATIVE central office staff has designed a test panel that makes tests on private line circuits more convenient and efficient. Built on a wooden panel strip, the panel is located close to the toll testboard to provide access for talking and dialing cords; close to a bay-mounted signaling testset to provide off-hook and on-hook conditions, and close to private line test jacks to provide access to any circuit.

The panel is a "do-it-yourself" project made from lamps, keys and jacks that every central office seems to keep as spare equipment. It has been used successfully with other regular test equipment to provide a full range of testing facilities. Some of the features provided for by the test panel are:

(1) Talking or monitoring from the testboard, handset or loudspeaker.
(2) Access for transmission or signaling measurements to the distant office, through the local equipment or to the subscriber's premises.
(3) Talk battery to the subscriber when the circuit is opened for testing.
(4) 20-cycle generator to ring the local subscriber or the distant line.
(5) A ground start for circuits requiring this condition.
(6) Access for testboard dial equipment to dial on the circuit and hold the connection.
(7) A 900-ohm resistor to seize and hold the line when the circuit is opened.
(8) A supervisory lamp on the subscriber's loop and guard lamps with the TEST CO and TEST SUB turn buttons.
(9) A built in 1.5 to 1.0 ratio repeating coil for matching 600-ohm test sets to line and loop impedances.

These combined features help do away with makeshift testing methods and provide a regular procedure that can become familiar to all the maintenance staff.

A Private Line Jack Field

The test panel is connected in series with the central-office equipment and the local subscriber's loop. Test jacks, cut into the subscriber's loop, have proven useful for determining the location of trouble, or for making tests through the local office equipment.

Private line circuits used to occupy

(Continued on page 22)

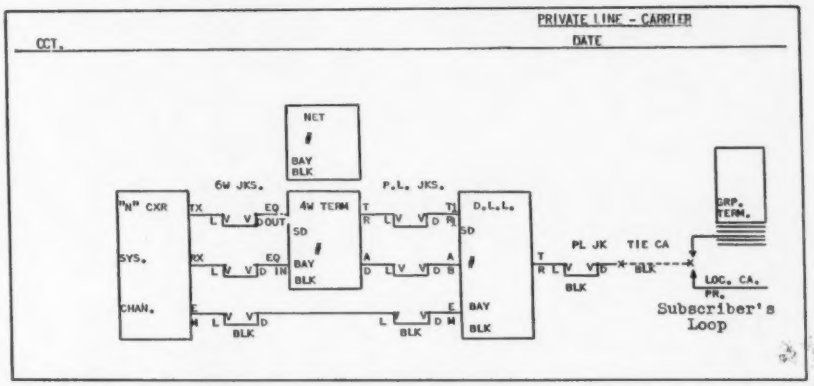

Fig. 2. An improved type of equipment card that displays the layout of the units. The private line jacks are located around the dial long-line equipment.

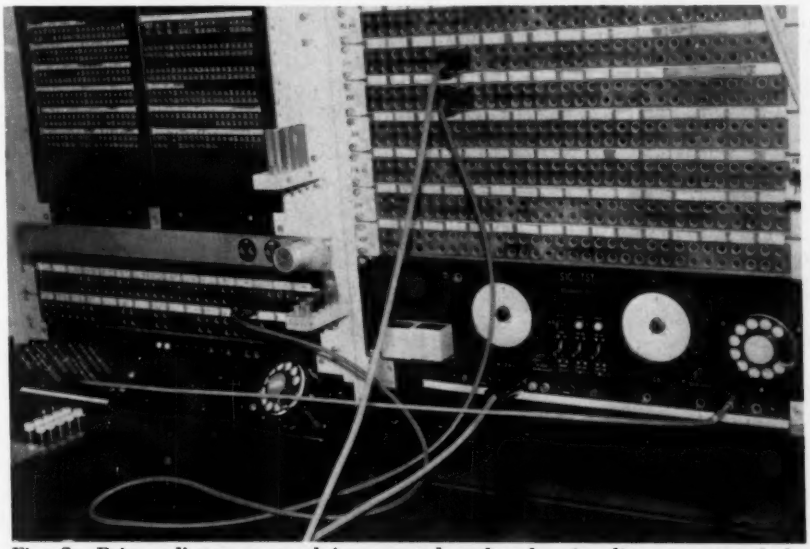

Fig. 3. Private line test panel is mounted under the signaling testset and the private line jack field. The right hand cord is from the testboard position circuit, left cord is in the SUB and CO jack and connects to the subscriber's loop jacks in the jack field. Extreme left cord connects the signaling testset to the private line EM jacks.

*Mr. Plaskett is with the Bell Telephone Co. of Canada. For 14 years he has worked in construction, installation and repair departments.

AE paystations are BUILT TO

AE paystations give you 6 other important benefits:

1. Attractive. Choice of 10 decorator colors.
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4. Anti-stuffing device prevents fraud.
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TAKE ABUSE!

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The coin box door is made of heavy sheet steel. It is so closely fitted to the housing that it's impossible to insert any tool. And, the door is case-hardened to resist drilling or prying.

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a small, reserved corner in most small and medium-sized offices. Today, as businessmen are made aware of the value of the telephone in more of their operations, the number of private line circuits has grown and they soon overflow into any available spare test jack.

Bringing the jacks together on one field permits the tester to plan his tests without wasting frustrating effort locating and determining the value of individual test points. In *Fig. 1*, the field above the signaling testset and the private line test panel has been reserved with room for growth; for private line test jacks. the four-line and drop jacks are located around the dial long-line equipment as illustrated in *Fig. 2*. This figure also represents an improved type of equipment record card that illustrates the circuit in schematic form instead of an equipment list (See TELEPHONY, Aug. 20, 1960).

The private line (PL) jacks provide access for tests toward the distant office, through the local equipment, and toward the subscriber's premises. After the trouble has been located, the jacks can be used with other equipment jacks to patch in spare units for an early circuit restoral.

Panel Construction Details

Fig. 3 shows the test panel mounted below the private line jack field and the signaling testset, and *Fig. 4* illustrates the schematic layout of the test panel. Available spare parts can be modified or substituted if necessary. The repeating coil should have a 1.5 to 1.0 line to drop ratio and a flat response across the 200 to 4,000-cycle test frequency range. A 120E type coil was used in this panel and introduced a 0.6 db coil loss that is compensated for when transmission tests are made. The battery and ground supply is distributed through a 13C key telephone unit (KTU), a unit commonly used by exchange installers for pushbutton telephone installations. The relays in the unit are wound like retardation coils to filter the battery supply. The coil and KTU are mounted behind the panel and under the jack and key wiring as illustrated in *Fig. 5*.

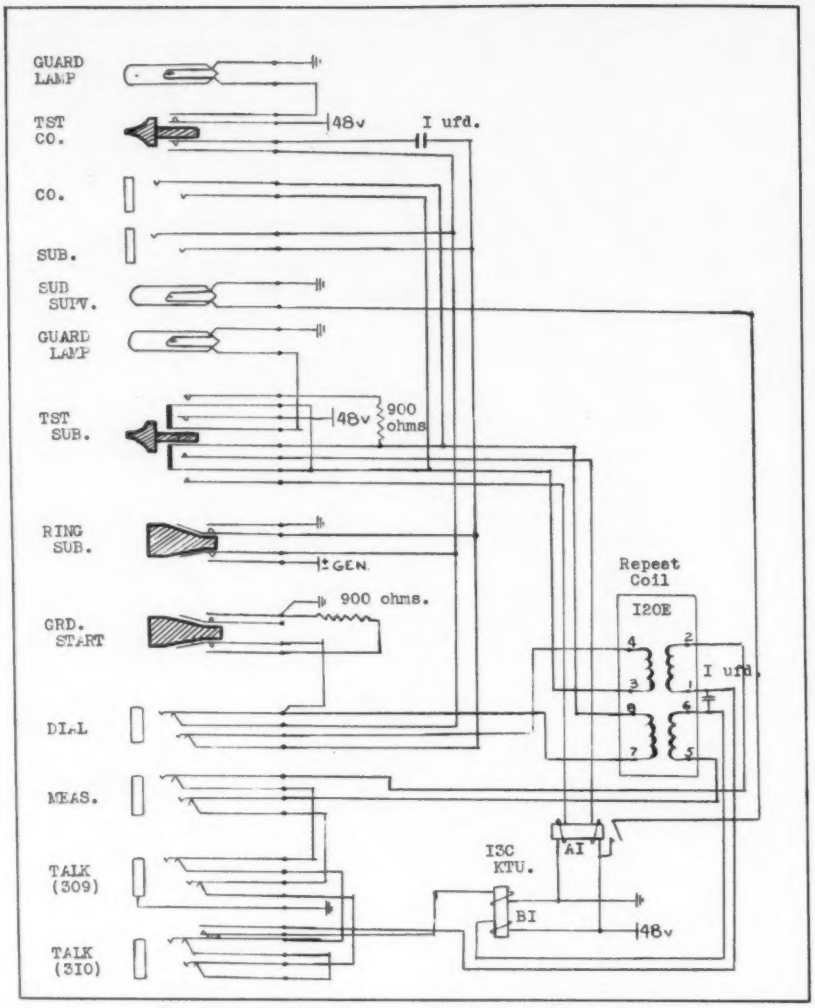

Fig. 4. Schematic diagram of private line test panel.

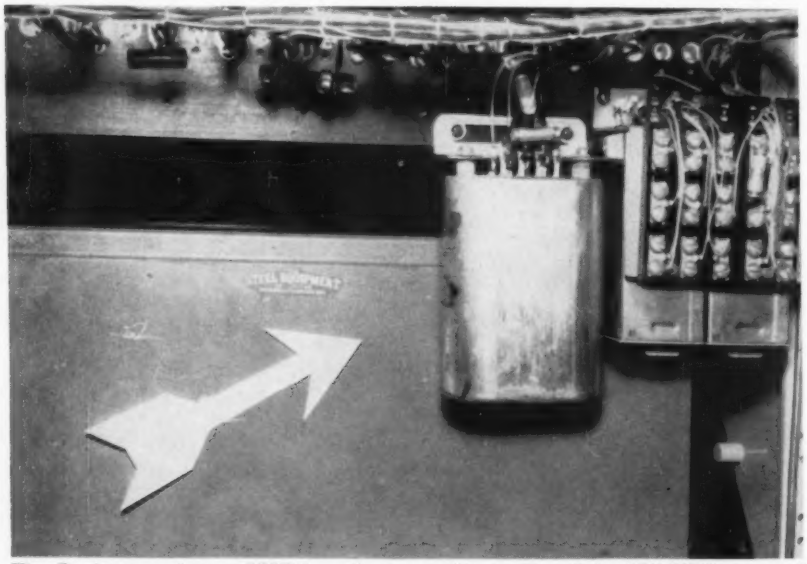

Fig. 5. Arrow points to 120E impedance matching coil and the 13C KTU mounted on brackets under the jack and key wiring of the test panel.

The test panel is connected to the circuit by means of a patching cord from the CO and SUB jacks of the test panel to the subscriber's loop jacks of the jack field. The signaling testset can also be connected to determine the condition of the line, although connecting the test panel will not disturb a conversation if the turnbuttons and guard lamps are idle.

If the dial long-line equipment used in the defective circuit provides talking battery to the local subscriber:

Connect the CO jack to the line of the subscriber's loop jack.

Connect the SUB jack to the drop

(Continued on page 52)

today's

Highlights

of finance-taxes-business trends

by Willard F. Stanley

BOOM IN BONDS CONTINUES: The 30 days ended Feb. 20 witnessed a continued sharp upturn in the bond market. Seven utility funded debt issues were shown by the Wall Street Journal's tabulation at Feb. 16 to have an average yield based on then-current bid prices, about 18 decimals (0.18 per cent per annum) lower than the average yield based on the original offering prices of the securities. Following an 11-decimal drop in yields registered by the same tabulation about a month previous to the above date, this adds up to a lowering in bond yields of about 0.30 per cent per annum in the 60 days since Dec. 20, 1960.

It's remarkable that this comeback was so swift and relatively unexpected, but several factors contributed to this unusual result. Perhaps most potent was the dearth of offerings during this period. The unusually small number of recent new utility bond issues coming to market is indicated by the inclusion in the Wall Street Journal tabulation of only seven such issues. The number covered is usually 11, 12 or 13. Furthermore, estimates are for a continuation in the paucity of new offerings for a while to come.

A triple "A" rated telephone bond was offered around the middle of February at about a 4.3 per cent yield basis and double "A" ratings have been coming out at around 4.5 per cent, with a number of triple "A" ratings selling in the market in the 4.40 per cent to 4.45 per cent yield range.

Another favorable factor has been the success of the recent federal refunding operation. Although long-term securities were not involved, the demand for the new issues lowered yields on all but very short-term federal obligations and assisted materially in the rise of utility bond prices.

President Kennedy has now announced his desire to follow a dual policy with respect to the federal securities market, keeping short-term issues, such as 90-day Treasury bills, at reasonably high levels, to avoid an increased outflow of gold, but reducing credit costs for long-term securities to stimulate business activity and aid in ending the recession as soon as possible.

Since these policies run somewhat counter to each other, time must ensue to see how successful they can be on a permanent basis. This dual approach has already been successful temporarily, since 90-day Treasury bills have strengthened in yield, rising from around 2.2 per cent 30 to 60 days back, to around 2.45 per cent at Feb. 16, while longer-term federal obligations have recently reflected marked ascensions in price. Recent decision of the Federal Reserve Board to purchase more federal obligations maturing in more than five years should be another bullish factor.

Mr. Stanley, formerly a utility financial executive, is now president of Corporate Services, Inc. of New York City and is well known as a financial writer. He is a member of the Controllers Institute of America and the New York Society of Security Analysts. He serves on the Finance Management Committee and the Tax Committee of the Controllers Institute (N. Y. Control). His articles are appearing once a month in TELEPHONY.

Some informed opinion believes that the rise in bond prices may be approaching its peak and that materially lower yields than those now prevailing cannot logically be looked for in the near future. The recent rise in prices (which has lowered yields more than 0.30 per cent per annum in two months and by 0.75 per cent or more since Jan. 1, 1960) has been so drastic as to indicate the desirability of bringing to market as rapidly as possible any funded debt securities which utilities will need to offer for requirements of this character during the next six months or so.

At recently increased average prices, utility common stocks have reduced the cost of equity money to a point warranting prompt offerings for equity needs considerably into the future.

* * * *

STOCKS GO ONWARD AND UPWARD: The booming bond market has been accompanied by a rising stock market, although the increase in prices in the 30 days prior to Feb. 21 didn't match that experienced in the 30 days preceding that date. From the close at January 24, the New York Times 50-combined-stock average rose 2.5 per cent at Feb. 24. At the latter date this average stood about 7 per cent above the 1960 year end; 10 per cent below the close of 1959 and one per cent higher than the end of 1958.

The recent course of the market has not been vertically upward, but rising on balance with quite a few generous declines, offset by even stronger upward surges. Some technical correction around these levels now seems indicated, but the general trend of the averages still would seem pointed toward higher prices.

The process of discounting the end of the recession still seems to be going on, plus a sort of mild generally inflationary psychology based on what the new Administration may undertake. Utilities have been getting a relatively fair share of the price increases, although below leading groups in this respect. The higher utility levels seem likely to hold or improve within the reasonably near future.

* * * *

NO SIGN OF RECESSION END: Many weeks ago some leading economists suggested the recession might be nearer its end than generally supposed. Instead of mid-1961, they began to speak of early dates as likely for a beginning of the turnabout in business activity. So far, these optimistic prophecies haven't materialized.

While news and earning power remain somewhat spotty, there still continues a strong preponderance of unfavorable statistics. Gross national product has slipped a bit in recent months, although the First National City Bank of New York "Letter on Business and Economics" attributes the decline to the inventory situation.

Consumer spending has also been declining, although not alarmingly, and unemployment reached a really impressive height in January at around 5.3 million, highest for a good many years. Furthermore, there is a good chance this figure will increase before turning downward.

Durable goods makers report lower sales and orders. One million passenger cars remain for sale, with both sales and production lagging.

Right now, most signs point to a continuance of unfavorable showings for several more months at least. Business spending for expansion continues at a relatively high rate, although considerably lower than early 1960 predictions. Housing construction continues on the laggard side, but the administration has moved toward reducing interest rates on home mortgages.

There may prove enough artillery in the Democratic anti-recession arsenal to turn the tide, if Congress should acquiesce and act with promptness. But so far there seems nothing in the aggregate of the Presidential proposals (up to Feb. 21) to instill a strong inflationary psychology.

The overall picture seems that of a new administration endeavoring to plug the leaks in the economic dike with a cluster of fairly moderate measures which, in total, seem hardly calculated to cause an immediate violent upsurge in business activity.

The Plant Man's NOTEBOOK

By RAY BLAIN, Technical Editorial Director

THE LARGEST RADIO station in the free world—at the time this is being written—is nearing completion on a rocky peninsula in eastern Maine. Even before activation, vital control functions were being checked and rechecked over telephone conference circuits of a small, commercially-standard Stromberg-Carlson private dial exchange.

This most powerful radio station generates 2 million watts—40 times the output of the biggest broadcast transmitters used commercially—and uses very long waves, up to 20 times the wave length of standard AM broadcasting. The explanation is that this station is designed to establish contact with *submerged* submarines. It is part of the Polaris program and is the only voice that can reach our missile-armed atomic fleet with a message everyone hopes will never have to be sent—the order to retaliate against an enemy attack.

Everything about this installation is fantastic. For example, there are two spiderweb antennas (6 panels each) which are made of bronze "lace," whose threads are 1 inch in diameter, and cover an area equal to 11 Pentagon buildings; 26 towers nearly 1,000 feet high supporting these rhombic diamond panels; 36 counterweights of concrete filled with concrete containing iron shot, and weighing 220 tons each, to provide compensation for wind pressures during the violent winter storms. Proper adjustment of these two antenna arrays under varying conditions of stress is the principal purpose of the telephone system. It also provides necessary intercommunication between various buildings on the 2,800-acre site.

The private dial exchange is also necessary for the safety of project personnel during broadcast periods, since any combustible substance, including people, would be burned to a crisp, if present in the gallery that carries transmitter power from the output transformer to the co-ax cables. Elaborate grounding precautions have been taken by coating the entire peninsula with a buried copper net running out into the sea.

Contrasts are vivid. The town nearest this installation is a typical, small Down East village. The 428 people refuse to let the influx of over 1,000 workmen and technicians change the character of the place, although the "outsiders'" money rings cheerfully in the till. Townspeople continue to hand-crank their telephone. However, the Bell company has promised improvement in service and toll dialing by the middle of 1961. Albeit, present methods do have certain advantages.

Phil McConaghey, the project engineer for Nat Harrison Associates, contractor for the base, reports a unique extension of person-to-person toll calls. While walking down the main street one day, he approached a telephone booth, heard the insistent ringing and, just for the fun of it, answered the telephone. It was for him! The alert operator had traced his actions, because an urgent call had just come in from the Miami headquarters of his company. She transferred the call to the booth, timed her ring carefully and "sat on the bell."

The station is now to be occupied by a complement of Navy officers and technicians. This world's most powerful transmitter went into operation in early January, but may its awesome purpose never be required in full actuality!

•

Michigan Bell Telephone Co. has encountered some aerial cable trouble recently that differs considerably from the usual rifle bullets or shotgun pellets. One case was caused when a steel-tipped hunting arrow punctured the lead cable sheath and the other by a fisherman's casting plug.

•

Do you know how the bellhangers bit got its name? We have used these bits for many years, but never knew why they were called bellhangers until we read an explanation in *Life Lines*, published by the California Water & Telephone Co. The article read as follows:

"In the old days before electric doorbells for dwellings were invented, a mechanical bell was very popular. This consisted of a bell attached to a spiral spring, usually located in the rear of the house. The bell was connected to a pull knob at the front entrance by steel wire extending through the basement or attic.

"A unique rocker arm contrivance was used at right angle turns. When the knob was pulled, the bell gave a ting-a-ling sound. The men who installed these bell systems were known as bell-hangers, and the long drills they used became known as bellhangers' drills or bits. With the coming of electricity, electric bells superseded the mechanical doorbell. Today, the trade of the men who installed those bells is no more, but the name of their drill has stuck."

•

In the old days, we often used large box kites to carry lines across rivers, over deep canyons and cliffs. This was a lot of fun, but time-consuming, and often not successful.

The present method is to make use of a special gun to carry a nylon cord for a distance of 550 feet. This gun is a smooth-bore, hammer type with an over-all length of 2½ feet. It makes use of a 45-calibre 70-magnum-load, blank cartridge to fire a 14-inch-long brass rod. The forward end of the rod is eyed for attachment of a braided nylon cord ⅛ inch in diameter. A

metal canister containing 550 feet of this cord is mounted under the barrel.

Fired at a 35 degree angle from the shoulder, the gun is able to project the cord a distance of 350-450 feet or more over rugged terrain and proves a time and labor-saver.

•

The Chesapeake & Potomac Telephone Co. now has about 644,000 telephones in service in the District of Columbia. This represents a net gain of 24,000 stations during the year. Local dial calls averaged better than 1.8 million per day, an increase of 5.7 per cent over 1959. Nearly 15 million toll calls were recorded, which was about 9.1 per cent greater than the volume for the previous year.

•

It is reported that the largest communications hookup in election day history sped news and pictures to the American people last November.

For television, the Bell System provided 10,000 miles of additional video pathways throughout the country. In all, a total of some 94,500 miles of TV channels made election day telecasts available in 317 cities in the United States. It is estimated that viewers in 46 million homes followed the returns from 486 network stations.

The Bell System also operated an additional 100,000 miles of teletype circuits to assist press associations to obtain election news over teletypewriter networks as fast as possible, and to furnish it to the nation's 1,750 newspapers and 3500 radio and TV stations.

•

While visiting Fort Monmouth, N. J., recently, the writer had the pleasure of talking over the radio-telephone ham radio station of Maj. Gen. W. D. Hamlin, the post commander. We called Col. Carl Hatch, retired, at Albuquerque, N. M.

The quality of the speech, much to my surprise, was comparable to a good, hard-wire circuit.

Cross Talk

It is reported that about 30 per cent of the gold produced in the world goes into industrial use—most of it for jewelry and teeth.

•

It is claimed that the United States is still the wealthiest nation. Where else could you have such a prosperous recession?

•

The wife who once complained of dishpan hands now suffers from push-button finger.

Plant Man's QUIZ

By RAY BLAIN, Technical Editorial Director

Q. What colors are available for telephone booths?

A. One company informs us that it can supply both inside and outside booths in 10 different colors. These colors are gray, maroon, rich red, dark brown, light brown, orange, flame red, highway yellow, thruway blue, and hunter green.

•

Q. We are experiencing difficulty on long span rural lines in preventing mid-span hits in windy weather. Is there a convenient method of preventing trouble of this nature?

A. If your corners are solid, it should be possible to resag your lines so that the wires are even in each span. The wires then swing evenly in a wind, and do not normally cause hits.

Another method is to make use of plastic spacer units. These spacers are made of high impact polyvinyl chloride for 5 inch, 6 inch, 8 inch, 10 inch and 12-inch spacings. This device is wrapped around the line wires in the center of the span to be maintained.

•

Q. What is the washer-type cable terminal protector and how is it used?

A. This type of protector was designed especially for use with plastic-insulated aerial and buried wire and cable in order to provide improved protection at a reduced cost.

One protector of this type consists of a 6-pair block with special plastic shell that contains 12 bronze binding screw posts and a 36-inch length of 24 AWG copper wire with color-coded vinyl insulation attached to each binding post. Stainless steel washers are firmly secured to each binding post.

A comb-type stainless steel ground plate mounts under the terminal block with the fingers of the comb extended toward the washers. Stainless steel mounting screws, nuts, and washers protrude from the bottom of the terminal block for insertion in Ready Access terminals, closures and pedestals.

Round washers were selected for use in this protector so that they can be rotated in the event they are burned severely by lightning. The use of stainless steel washers dissipates heat and minimizes the blistering associated with non-ferrous metal discharge surfaces. They are not designed to protect paper-insulated cable since it has a much lower breakdown value than these washer gaps.

The stainless steel washer protectors have gaps with arc-over values of 4,000 volts dc, and a maximum of 9,000 with a 1 KV per microsecond pulse voltage.

The cost of this type of protection is said to be less than 25 per cent of the cost of carbon gap protectors. This price advantage makes it possible to use this protection more liberally and obtain full count protection. Some engineers have advocated the use of this type protection on all terminals located in a high lightning incidence area, both aerial and underground.

•

Q. What type of load coil cases is recommended for installation on direct burial cable?

A. One kind of load coil case available for this purpose is of welded construction, which provides a moisture and pressure-tight enclosure for the load coils inside. These cases are given an additional protective coating of an epoxy asphalt paint and then, in turn, wrapped securely with vinyl tape which protects against the severe corrosive conditions to which they are exposed. Cases may be obtained equipped with either lead or plastic stubs.

•

Q. Will it be possible, to obtain a telephone with a dial light that operates from the line current, and which does not require a connection to the commercial power?

A. There is a telephone now on the market which is lighted by the line voltage and does not require a connection to an ac convenience outlet. The soft glowing light of the dial is intensified when the receiver is lifted.

Bell System 1960 Construction Biggest Ever, Report Shows

THE YEAR 1960 saw the Bell System complete its biggest construction program ever and continue heavy emphasis on developing a satellite network to provide worldwide telephone, data, and television communications, the American Telephone & Telegraph Co. said on Feb. 21 in its annual report to 1,911,000 share owners. AT&T hopes to be testing a satellite in orbit by early 1962.

"We feel strongly that private enterprise can best maintain America's leadership in space communications," said Frederick R. Kappel, AT&T president. "We are ready to do the job, eager to move ahead, and confident the result will serve the public interest well."

In reporting 1960 earnings equal to $5.53 per AT&T share against $5.22 in 1959, Mr. Kappel said: "Good profit and fair rewards to risk capital are vital to sound economic growth. Without the improvement made in earnings in recent years, the Bell System could not possibly move forward as the times require."

The Bell System construction program in 1960 cost a record 2.6 billion dollars. More than 1 billion dollars of new capital was raised.

"We shall be enlarging and improving our plant in 1961 on almost the same scale as last year," Mr. Kappel said, "and much new capital will be needed."

The total tax bill on Bell System service was 2.5 billion dollars, an average of $41.89 per telephone. Federal, state and local taxes on operations were $1,848,000,000 and telephone users paid an additional 640 million dollars in federal excise taxes.

Mr. Kappel said the 10 per cent excise tax on local telephone service "puts a burden on the telephone that is borne by no other household utility. We hope it will be allowed to die this coming June 30."

Other highlights of the report:

The 1960 gain of 2,793,000 telephones brought the number of Bell System telephones to 60,735,073, about 97 per cent of them dial-operated. Telephone calls averaged more than 219 million daily, up from 208 million in 1959.

Direct Distance Dialing was extended so that half the Bell System customers now can dial their own long distance calls. Long distance usage increased 7 per cent.

Data-Phone service, which allows business machines to "talk" to each other over the telephone, is growing rapidly, with some 1,100 Data-Phone sets in service at the year's end.

The world's first electronic central office, forerunner of telephone switching systems of the future, went into trial operation at Morris, Ill.

New services introduced in 1960 included Home Interphone, a home intercommunicating system tied in with regular telephone service; Farm Interphone, a similar system for farms; and Bell Chime, which announced telephone calls with a musical tone. Bellboy, a personal signalling service featuring a pocket-size radio receiver, was provided in 18 cities.

Two other services developed in 1960 now are ready to help meet the growing needs of modern industry.

Wide Area Telephone Service, offered in January, 1961, allows businesses and other large long distance users to call over very wide areas—even across the continent—for a flat monthly rate (TELEPHONY, Jan. 21). TELPAK, designed for customers who send large quantities of communications between specific points, will furnish broadband channels for telephone, teletypewriter, high-speed data, facsimile, and other communications needs (TELEPHONY, Feb. 25).

To help meet the increasing demands for overseas service, the Bell System in 1960 accelerated its submarine cable construction program. It now is building—jointly with Cables & Wireless, Ltd. of Great Britain—cable systems between this country and Bermuda and from Puerto Rico to Antigua.

Another cable from Florida to Jamaica will be laid in 1962. A third transatlantic cable is planned for 1963. In the same year, the Florida-Jamaica cable will be extended to South America. In 1964, a cable will be built between Hawaii and Japan, and a second cable will be laid between Hawaii and the U. S. mainland.

In addition to space communications, the Bell System continued to be a major participant in other science and defense fields.

Western Electric Co., manufacturing and supply unit of the Bell System, headed an industrial team that has virtually completed a series of tracking stations which will maintain communications with the nation's first Astronaut. Since September, a communication system developed by Bell Telephone Laboratories and installed by Western Electric, has been carrying data from Ballistic Missile Early Warning radar in Greenland to North American Air Defense Command headquarters at Colorado Springs.

The Bell Laboratories also did intensive development of the Nike Zeus missile system for defense against long-range missiles, and Western Electric is developing methods of manufacture. The Laboratories' guidance system for the Titan missile and for space vehicles proved "outstandingly successful," the report said.

Bell System employes totalled 735,766 at the end of 1960, and the System paid $4,174,000,000 in wages during the year.

"Notwithstanding dial equipment, computers, and every other kind of machine, this business is run by men and women and always will be," Mr. Kappel said. "Our success depends utterly on the quality of the human effort."

In the report, Mr. Kappel also commented on three issues—economic, political and regulatory—about which the Bell System is stepping up its efforts to inform employes and stimulate their thinking. The three issues were referred to as follows:

"(1) In 1959 Congress voted to end the 10 per cent tax on local telephone service as of June 30, 1960. However, last spring the termination date was postponed until June 30, 1961.

"This tax is unjust and discriminatory in the extreme, as is the similar tax on long distance service. It was passed as a 'temporary' wartime measure. It taxes a necessary service at a luxury rate. It puts a burden on the telephone that is borne by no other household utility.

"These facts are generally recognized—but still the tax has continued. We hope it will be allowed to die this coming June 30.

"(2) In 1960 the Federal Communications Commission made final an order that opened the way for almost unrestricted licensing of private microwave radio systems. Microwave radio frequencies are a limited natural resource, and such wide-open licensing would ultimately limit their availability for public services.

"Also, wide-open licensing would seriously compound the problem of providing frequencies for space communications, and make it more difficult for this country to coordinate with other countries in that field.

"Still pending before the commission is our application for additional frequencies to expand general public telephone service to vehicles. Only if the necessary frequencies are allocated can this service be made adequate.

"Private microwave systems compete, of course, against Bell System services to companies that have need for extensive communications. We have submitted our proposals for competitive services to the regulatory bodies, and have no doubt of our ability to provide systems and services of superlative value, at prices that are attractive to customers and profitable to us.

"However this point should be made: There is no excise tax on communications over a private system. But there is generally on publicly offered service. Thus the Bell companies, whose rates

(Continued on page 51)

GT&E Sales and Revenues Reach Record High in 1960

GENERAL Telephone & Electronics Corp.'s diversified communications and manufacturing operations reached a new record total of 1.18 billion dollars of sales and revenues during 1960, surpassing its previous high of 1.08 billion dollars set in 1959.

Net income of 72.4 million dollars was also the highest in the corporation's history. Total assets amounted to 2.2 billion dollars at the end of the year, up from 1.82 billion dollars at the close of 1959.

In releasing results for the year Donald C. Power, chairman and chief executive officer, pointed out that "there are many opportunities ahead for the General System in the complex communications, electronics and fields of automation which make up a large part of our business. Many challenges will confront us as the economy expands, but I am confident of our ability to meet these challenges effectively."

Combined operating revenues of telephone subsidiaries were $477,188,000 and included for the first time the operations of British Columbia Telephone Co. in Canada. This company, in which the corporation previously held a minority interest, became a subsidiary in December, 1960. Telephone revenues, including British Columbia, were 11 per cent ahead of 1959.

Net sales of the manufacturing group amounted to $701,287,000 which was a slight decrease from the 1959 total. Mr. Power pointed out that "increased earnings from telephone operations more than offset the lower total income of the manufacturing group which was caused by intensive competition during the latter part of 1960 in some of our commercial product fields."

Earnings of the corporation were equal to $1.04 per common share on the sharply increased average number of shares outstanding during the year. Comparable earnings were $1.13 in 1959. The average number of shares in 1960 was 69 million against 62,990,000 in 1959. Mr. Power also stated:

"More than 274 million dollars was spent last year for improvement and expansion, bringing the total invested during the past five years to more than one billion dollars.

"A total investment of 269 million dollars for new telephone plant and manufacturing facilities is planned for 1961.

"Although every effort was made to minimize the rising costs of expanding and improving telephone service, it became necessary in several operating areas to seek approval for the repricing of telephone services from regulatory commissions to provide fair and reasonable return on the capital invested in our business.

"With the same objective, vigorous attention continued to be given to negotiations with connecting companies in order to strengthen our earnings by obtaining more equitable compensation for jointly rendered toll services."

Domestic telephone companies of GT&E at year-end served nearly 4,107,000 telephones in 5,600 communities of 12 million population in 31 states. International subsidiaries served more than 566,000 telephones in Canada, the Dominican Republic and Haiti. GT&E also has a minority interest in the Philippine Long Distance Telephone Co.

During 1960, GT&E manufacturing companies engaged in the development and production of many highly advanced types of communications and electronic equipment. Automatic Electric Co. introduced its new Starlite telephone. The company also made good progress during the year in expanding the scope of its Industrial Products Division. This company is applying its 70 years of experience in dial telephony to the development and production of complete industrial systems in the broad fields of automatic controls, data gathering and associated voice communications systems, Mr. Power stated.

Sylvania, as one of the two top producers of electronic tubes, produced its 2-billionth receiving tube during 1960. All manufacturing companies introduced major innovations and improvements to lower costs and enlarge their product lines, Mr. Power said.

Major defense programs include the data processing equipment which serves as the "nerve center" for the Air Force's Ballistic Missile Early Warning Systems, now in operation in Greenland, and similar equipment soon to be installed in Alaska. Communications systems are being developed for Atlas and Minuteman intercontinental missile launching sites in the United States and for Polaris missile launching submarines.

The General System currently has 3,600 scientists and engineers in 26 laboratories with basic research and advanced development centered at General Telephone & Electronics Laboratories in Bayside, N. Y.

At the present time, General and its subsidiaries employ over 90,000 men and women.

Schaefer Elected President Of Illinois Independent

Directors of the DeKalb-Ogle Telephone Co., Sycamore, Ill., at their annual meeting on Feb. 14 elected Daniel A. Schaefer president of the company.

Mr. Schaefer started with the DeKalb-Ogle company in March 1953 as assistant general manager. He was promoted to general manager in February 1956 and vice president in June 1960.

Prior to joining the DeKalb-Ogle Telephone Co., he was with R. W. Beck & Associates, consulting engineers, Seattle. He was also with the Indiana Bell Telephone Co. in the traffic and general engineering department prior to, and after World War II.

As a lieutenant colonel, U. S. Army, he commanded the 424th Field Artillery in Korea and the 304th Field Artillery during World War II.

He graduated from Purdue University with a Bachelor of Science degree in Electrical Engineering, and later attended the Indiana University Business and Law schools.

The directors also elected other officers for the coming year, as follows:

Vice president, Clifford Danielson.
General manager, N. J. Kathman.
Secretary & treasurer, T. W. Joslyn.
Assistant secretary & assistant treasurer, C. M. Hopkins.

D. C.-to-Australia Call Is Relayed Via the Moon

Dr. Hugh L. Dryden, deputy director of the National Aeronautics & Space Administration (NASA), telephoned by way of the moon to a member of the Australian Cabinet on Feb. 10.

Dr. Dryden spoke from his Washington, D. C. office at 12:45 p.m. to Alan Hulme, Australia's minister of the Department of Supply.

It took the message less than 2½ seconds to travel the 455,700-mile moon route to Australia.

The message was received at the island lagoon deep space tracking station at Woomera in southern Australia by Mr. Hulme. Mr. Hulme replied by regular long-range radio.

The Woomera station is one of three, each equipped with an 85-foot radio antenna, with which NASA will track deep space probes of the future.

Invincible Strength

"The real difference between men is energy. A strong will, a settled purpose, an invincible determination, can accomplish almost anything; and in this lies the distinction between great men and little men."—FULLER.

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Great Britain's

SUBMERGED TELEPHONE REPEATER

By W. McMILLAN*

THE SUCCESS OF repeatered submarine telephone cables since World War II has brought a spate of new systems. A system now completed, and notable from the British point of view, is that between the United Kingdom and Sweden, the longest European cable of its kind.

In 1961 the biggest all-British system ever attempted will be completed between the United Kingdom and Canada and will use a single cable to give 60 simultaneous two-way telephone circuits. This is the first link in the Commonwealth round-the-world telephone cable system proposed by the Commonwealth Telecommunications Conference in London in July 1958.

Round-The-World System

The second part of this round-the-world system will be the Canada-New Zealand-Australia link, due for completion in 1963. The choice of the British repeater for this route, some 7,600 nautical miles (14,065 kilometers) long, reflects the confidence placed in the repeater, and in its ability to operate for many years on the sea-bed without attention.

Submerged repeaters alone make this type of communication link possible by amplifying the electrical signals on their way along the cable before they become so weak that they are indistinguishable from the background noise.

Standard Telephones & Cables Ltd. has manufactured submerged repeaters in Britain for the last decade. Starting with relatively simple shallow water systems such as The Netherlands-Denmark cable, the company was chosen to build repeaters designed in cooperation with the British Post Office for a cable between Scotland and Norway.

British practice has always been to house the repeater in a rigid steel case, with enough room for equipment which amplifies and equalizes both directions of transmission on a single cable.

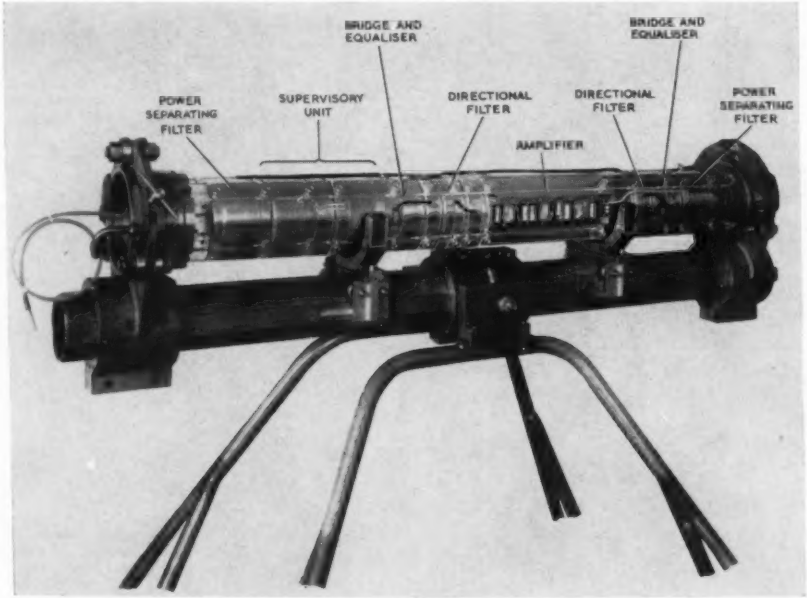
The practice in the United States, as on the Key West-Havana, and the first two transatlantic cable systems (TAT-1 and TAT-2), has been to use a repeater of flexible construction which could be fed through the normal shipboard cable-laying gear. These repeaters amplified in one direction only, and therefore, two separate cables were needed for each system.

This practice will now be changed, since the advances in cable-laying techniques have made the laying of rigid repeaters less of a problem than before. The U.S.A. repeaters, which will be used on TAT-3, another transatlantic cable, will be somewhat similar to the British ones, and capable of two-way amplification, using a single cable.

This upsurge of activity in submarine repeatered cables prompts the questions: Why are these cables necessary, and why was the repeater not developed earlier?

The answer to the first question is that the radio links hitherto used for long-distance telephones are often subject to severe fading, sometimes mak-

*Mr. McMillan is a well-known London writer on telecommunications.



The repeatered submarine telephone cable has made possible great strides in communication, including the British Commonwealth round-the-world system, the first stage of which, between Britain and Canada, will be completed in 1961. Here a repeater is shown on its assembly and wiring rig at Standard Telephones & Cables Ltd., North Woolwich, London.

ing their use impossible. Again, elaborate precautions have to be taken when messages involving national security are transmitted, to minimize their interception.

The Long-Life Valve

The radio channels used for radiotelephony have a limited available bandwidth, and demand for space in the radio frequency spectrum greatly exceeds that which is available.

With a "solid" cable circuit, there is no fading, and little chance of messages being intercepted. Although the bandwidth on present cable systems is somewhat restricted, the same frequency spectrum can be used over and over again by adding further cables.

Serious work on submerged repeaters began in the 1930's, and some experimental models were made during World War II. The development of a long-life valve was the first objective; this involved intensive study of the mechanical structure of the electrodes and of the aging characteristics of the cathodes.

Not only valves, but every component, and its life and aging characteristics, had to be examined, the capacitors, coils, resistors, valve sockets, wire, insulating materials, and even metal surfaces.

Another consideration is that the growth of "whiskers" on the metal surfaces of a repeater could cause short-circuits, which could damage it. To guard against this possibility, all major surfaces of a repeater are gold-plated.

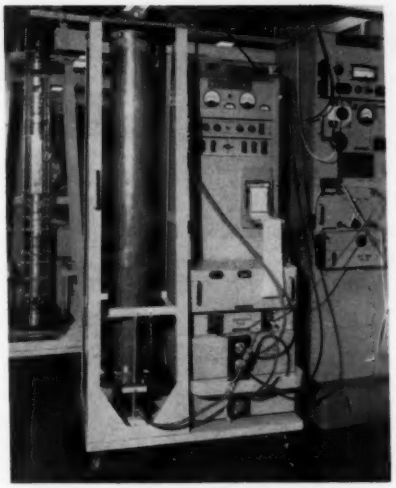
Manufacturing Precautions

The results of early tests on repeater components confirmed that a clean, air-conditioned plant was necessary for their manufacture, and that an entirely new psychological approach would have to be made to meet the requirements of long life.

In a submerged repeater, reliability and long life must precede every other design consideration. This naturally makes it more expensive than are land-based repeaters.

To replace a faulty repeater involves the cable ship's time and lost telephone traffic revenue, which could add up to a great deal of money. Therefore, it is better to spend time and money on the repeaters themselves, in the first instance.

In 1953, Standard Telephones & Cables Ltd. set up a special manufacturing organization for the design, manufacture and testing of submerged repeaters at North Woolwich, London. This unit has produced more than 250 repeaters since then, and has a very full program ahead of it during the next few years.



This is an example of the submerged repeater which will be used on the first stage of the British Commonwealth round-the-world telephone system — between Great Britain and Canada, due to be completed in 1961. Repeater is shown with its test equipment at the North Woolwich, London, plant of Standard Telephones & Cables.

Another repeater manufacturing unit is being built at North Woolwich to give increased production capacity. This new plant will be in operation in a few months. Inside these workshops, the work is carried out in almost clinical conditions, the operators wearing special lint-free clothing, and being forbidden to smoke or eat within the work areas, to ensure that no foreign matter find its way into any of the components.

Similar conditions exist in the submerged repeater capacitor shop in the company's main capacitor factory at Paignton, Devon.

Typical of the rigorous inspection procedures carried out are:

The x-ray inspection of wire-wound resistors and capacitors.

The individual noise measurements on resistors while they are being vibrated.

In the manufacture of coils, the insulation at the wire ends is removed electrically in an atmosphere of dry nitrogen to avoid oxidation. Conventional methods, using cutters or pliers, would damage the wire and perhaps weaken it.

Comparison of Cable Systems

The technique of inserting repeaters into long telephone lines is not new; for Britain's first telephone repeaters were installed in 1923.

Briefly, the repeater's functions are two-fold:—to equalize the distortion in the level frequency characteristic of the received signals; and to amplify the equalized signals for onward transmission to the next section of line.

On submarine cables, it is necessary to plan the whole of the system complete, taking in the cable, the submerged repeaters, land repeaters, if any, and terminal equipment.

Once the maximum permissible noise level at the receiving end has been decided upon, the system plan depends upon the number of speech circuits to be sent along the cable (frequency bandwidth); the amplifier gain characteristic; the power-feeding arrangements; and the relative cost of repeaters and cable.

Present-day land trunk telephone cables are capable of handling hundreds of telephone circuits. A widely-used system in Britain transmits a frequency band up to four mc's, accommodating 960 channels on each coaxial tube. The "go" and "return" channels

(Continued on page 34)

	Typical Land System	*Typical Submarine System*
Circuit capacity	960	60
Circuit routing	Separate coaxial tubes for each traffic direction.	Single coaxial cable for two directions.
Type of cable	Polythene disc, air-spaced coaxial.	Solid polythene dielectric coaxial.
Repeater spacing	6.1 miles (9.81 kilometers).	26 nautical miles (48 kilometers).
Power feeding	High voltage ac over coaxial center conductors. Repeaters fed in parallel.	Constant dc through cable center conductors. Repeaters fed in series.
Supervisory arrangements	Alarm and voice-frequency speaker circuits over separate cable pairs laid up in the interstices around coaxial tubes.	Speaker circuit is on a carrier channel. System monitored continuously at terminal. Test tones follow traffic routing on carrier channels.

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To meet the needs of different customers, you must provide many types of phones—standard *and* special. Why? Because it's profitable! The customer who wants a special phone pays for the extra service.

Any new customers in your area? Any old ones with new telephone needs? If so, show them the AE phone best suited to their particular needs. Contact your AE representative. He'll be glad to give you full details on our complete line of telephone services and related instruments. Only AE offers 15 different phones to meet different customer needs.

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are on separate tubes for simplicity (this is known as a four-wire circuit). A new STC system, installed in Britain and in Sweden, transmits a frequency band up to 12 mc, equivalent to 2,700 telephone circuits.

Because of the high frequencies used on land systems, the cable attenuation is high, necessitating repeaters every 6 miles (9.65 kilometers) for a four-mc system; and every 3 miles (4.80 kilometers) for a 12-mc system.

One of the main differences between land and sea cables is in the permissible repeater spacing, and therefore, the bandwidth of the system. A repeater spacing of 3 or 6 miles would present many difficulties on a submarine system, namely:

(1) On long cables, the total number of components (about 300 per repeater) would be enormous and would increase the chances of failure. For example, a 2,000-mile (3,220 kilometers) cable with 3-mile repeater spacing would have 200,000 components; and the failure of any one could perhaps impair the whole link.

(2) As submerged repeaters are fed in series with a direct current, the voltage dropped at each repeater being about 70 volts, the voltage which would need to be applied to the end of the cable would impose great strains on the cable and the end repeaters. For example, a 2,000-mile system with 3-mile repeater spacing would require a power feeding voltage of nearly 50 kv. Even if this voltage were divided between the two cable ends, it would still be too high for safety.

(3) The equipment required to supervise the system and locate faults would be very complicated and expensive.

(4) A system with such a close repeater spacing might prove more expensive than two simpler systems with half the bandwidth.

(5) The task of cable-laying would be slow and difficult, especially since a large number of separate submerged equalizers would be required to take up the cumulative error left uncorrected by the fixed equalizers in the repeaters. These separate equalizers are adjusted on board the cable ship during the actual laying of the cable.

The table on page 31 lists some of the differences between typical land and sea cable systems:

Cable Frequencies

On land coaxial cable telephone systems there is an established method of building up a frequency band out of individual telephone speech channels. The technique is known as "frequency multiplexing."

By a series of modulation processes using fixed-carrier frequencies, large numbers of speech channels are lined up side-by-side in the frequency spectrum so that they can be transmitted without mutual interference. The separation at the receiving end is by high-selective filters, followed by a demodulation process using the same carrier frequency as is used in the modulation process.

One of the basic frequency blocks used in carrier telephony is the supergroup, which consists of 60 telephone channels at four-kc intervals between 312 kc and 552 kc. For "two-wire" operation over a single submarine cable, this supergroup band undergoes a special modulation process at one terminal, so that it occupies the spectrum from 20 kc to 260 kc. This was the arrangement on the Nova Scotia-Newfoundland section of the TAT-1 cable. Subsequent cables have used different frequencies, but the techniques are similar.

On CANTAT, the 1961 U.K.-Canada cable, on the U.K.-Sweden cable, and on the new U.S.A.-Bermuda cable, the frequency spectrum is as shown in *Fig. 1.* The "high-group" band is split to accommodate special supervisory tones sent from the terminal stations to test the cable and the repeaters.

Repeater Circuitry

A constant-value direct current is fed along the center conductor of the cable; this current passes through the valve heaters in series, the potential differences so produced being sufficient to be used as the valve anode and screen supply *(Fig. 2).*

It is necessary, therefore, to separate the carrier-frequency signals from this direct-current supply at each repeater. At each end of the repeater is a power separating filter which is, in effect, a dc blocking circuit. These filters must have very good insulating properties, since the voltage at which power is applied to the cable may be of the order of 8 to 10 kv.

The carrier signals thus separated from the power circuits are then routed through the repeater so that low-group and high-group bands are amplified together in a common amplifier, but are equalized separately. Directional filters separate these bands at the input and output of the amplifier.

The amplifier unit consists of two three-stage amplifiers connected in parallel between common input and output transformers with a single feedback network, this arrangement permitting one amplifier section to fail without appreciably affecting the over-all gain of the unit. In these circumstances, however, the distortion is increased;

(Continued on page 47)

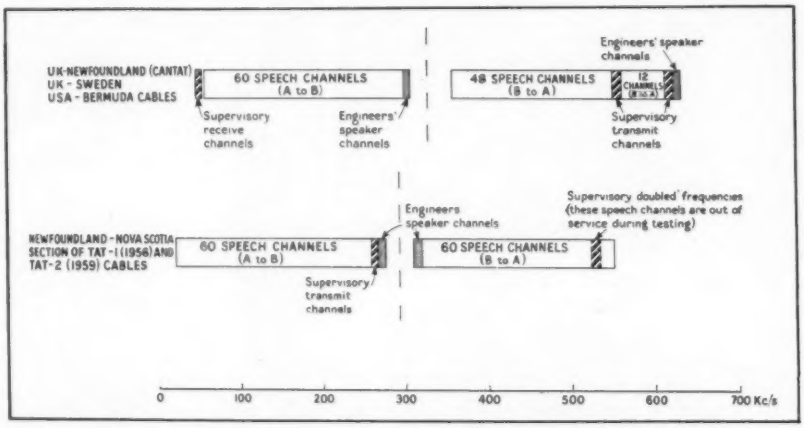


Fig. 1. Diagram showing the frequency spectrum handled by British two-way submerged repeaters on typical telephone cables.

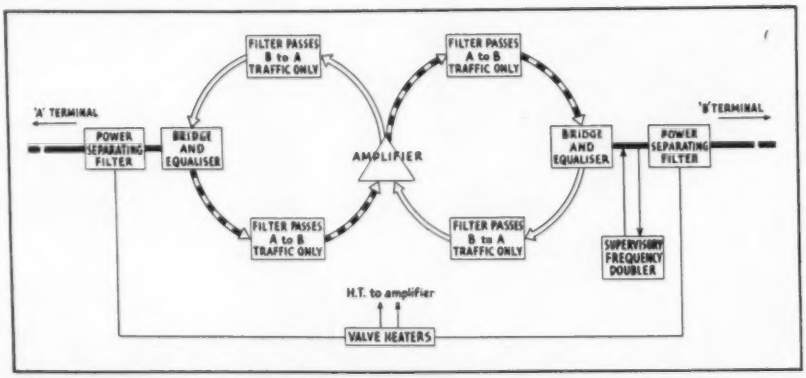


Fig. 2. Diagram showing the paths of speech channels through a typical repeater used successfully on new telephone systems.

THE Operator's Corner

By MAYME WORKMAN — TRAFFIC EDITOR

"THANK YOU," IS a well-known phrase in a telephone operator's vocabulary. It is used daily when handling subscribers' calls.

Most of us discover early in life that a good way to get more of anything is to say "thank you" when we do get something. Those who are indifferent rarely reap a rich reward.

Three things must be kept in mind in saying "thank you." First, we must remember to say it; second, we must say it sincerely; and third, we must know a variety of ways to say it.

The first point may seem too obvious to dwell on. And it is—as far as the obvious occasions are concerned. But what about the not-so-obvious ones? The favor graciously done? The service beyond the call of duty? The recommendation by a friend of you or your company? The filling of a request? The interview or advice that helped so much?

There are endless opportunities to stimulate good will for yourself and your company. All you need to do is keep alert to possibilities.

Sincerity demands simplicity. Saying *thanks* sincerely calls for skill. It's an art that must be developed. Overdo, and you'll sound phony. Underdo, and you'll seem indifferent. You've heard the saying, "let the punishment fit the crime." Well, in saying "thank you," let the expression fit the occasion.

This brings us to the third point —variety. Variety is important for two reasons. First, to find an expression that fits the occasion, you must have at your command many ways of saying *thank you.* Second, it's monotonous, for both you and your customers, when you say the same thing in the same way all the time.

Now there's not a thing wrong with a simple "*thank you for . . .*" On many occasions it does the job in just the right way. Continue to use it generously, but don't make it your stock phrase. Your real concern is to recognize the occasions that call for a more generous measure of appreciation, and the occasions when a direct *thank you* would be entirely out of place.

If you have been a telephone operator for a number of years, you will remember the stock phrases that were used in dealing with subscribers, regardless of the situation.

In writing letters, as well as in working at a switchboard, there are many opportunities to express appreciation and many ways of saying "thank you." The following are just a few suggestions for variations which may be used.

In expressing appreciation for comments and suggestions, we may say, for example, "Your comments were indeed interesting, and I know your suggestions will be of real help to us." Or, "It was generous of you to take the time to send us your helpful comments and suggestions."

In thanking a company for its service, appreciation may be expressed by saying, for example:

"I had no idea that a large organization such as yours would evidence such a personal interest and sincere desire to be of help."

Or "Your company is to be congratulated on having so understanding, patient, and friendly a person as you to help us with our problems."

Or "Your company has displayed a helpful personal interest in transactions with me over the years, which deserves my liveliest appreciation."

Another way of saying "thank you" is summed up in: "All my dealings with your company have been most satisfactory, and I am very grateful."

To say "thank you" for a booklet you requested:

"We appreciate your promptness in sending the booklet we requested. It is well-written and answers all of our questions."

Or "Your attractive easy-to-read booklet has been a real help to me in planning my current program, and I'll appreciate its help in future years as well. I hope my comments on your booklet have helped express my sincere thanks to you for sending it."

In expressing appreciation for helpful cooperation one may say:

"You and others of your organization have been most helpful and cooperative in every way."

Or "Your help, so graciously given, has been invaluable to me."

Or "I sincerely appreciate your help and cooperation in clearing up this problem."

In expressing appreciation for a letter, one of the following phrases may be used: "Your prompt reply to our inquiry is sincerely appreciated;" or "It was thoughtful of you to let us know you will be at the meeting."

Remember to say "Thank you;" say it sincerely; and say it in a variety of ways.

Traffic Questions

(1) Is traffic to and from Puerto Rico classed as "overseas?"

(2) Is traffic to and from Puerto Rico handled by overseas operating practices?

(3) Are English-speaking operators provided in Puerto Rico?

(4) Do toll operators in the United States and Canada dial directly to the telephones or operators in Puerto Rico?

(5) Is DDD service to Puerto Rico provided at this time?

Answers to questions are on page 52.

A Nation's Birthright

"We have staked the whole future of American civilization, not upon the power of government, far from it. We have staked the future of all of our political institutions upon the capacity of each and all of us to govern ourselves, to control ourselves, to sustain ourselves according to the Ten Commandments of God."—JAMES MADISON.

Courts and Commissions

Authorize Ore. Company to Split Common, Issue Stock

Oregon Public Utility Commissioner Jonel C. Hill on Feb. 20 approved the proposals of Mt. Angel Telephone Co. for a split of its common stock and the issue of additional stock.

The Mt. Angel company, serving approximately 500 stations, was authorized to issue 1,600 shares of $3.12½ par value common stock on an eight-for-one basis to replace its outstanding 200 shares of $25 par value common stock.

The company also was granted authority to issue, prior to Aug. 31, 240 shares of its $3.12½ par common stock at $25 a share. Stock is to be offered to stockholders on a pro rata basis, but those shares not sold will be available to other individuals. Proceeds of $6,000 from sale of this stock are to be used to purchase PABX equipment and station wiring at the Benedictine Sisters Convent, Mt. Angel.

The company also was authorized between Sept. 1, 1961 and Aug. 31, 1963, to sell enough common stock to produce an additional $4,000 to be used for DDD trunks, 100 more lines, and selectors for its central office. Mt. Angel has completed a cut-over to dial, and additional funds will enable the company to add equipment for new services and improvements.

Capital ratios at Dec. 31, 1960, and the pro forma, after giving effect to the approved common stock are as follows:

	Dec. 31, 1960	*Pro Forma*
Long-term debt	62.0 per cent	56.5 per cent
Common equity	38.0	43.5

N. J. Company Authorized to Sell $1½ Million in Bonds

The United Telephone Co. of New Jersey, it was reported on Feb. 19, has received permission from the New Jersey Department of Public Utilities to sell $1,500,000 in first-mortgage bonds at 4¼ per cent, the bonds to be due in 1991.

Purchasers of the United Telephone bonds are: The Western & Southern Life Insurance Co. of Cincinnati, O., $500,000; the Aid Association for Lutherans, of Appleton, Wis., $500,000; Ohio Mutual Life Insurance Co. of Cincinnati, $250,000; and the Midland Mutual Life Insurance Co. of Columbus, O., $250,000.

The commission also authorized the issue and sale of 50,000 shares of common stock with a par value of $10 per share to United's parent company, the United Utilities, Inc., Abilene, Kan., to raise an additional $500,000.

The New Jersey company plans to use the 2 million dollars to pay outstanding short-term notes of $1,100,000; refund advances of $675,000 previously made by United Utilities; and to pay $225,000 for plant additions, some of which have already been made.

OK Trial of Metropolitan Area Service in Mich.

The Michigan Public Service Commission on Feb. 20 approved a one-year experiment in which the Michigan Bell Telephone Co. will offer four Detroit suburbs Metropolitan Area telephone service. This service will be offered to one-party subscribers at a special monthly rate.

Optional, the service involves two separate plans. One will be tested in Birmingham and Southfield, the other in Farmington and Plymouth. Under both plans, subscribers will be able to dial calls for the special rate to about half the telephones in Michigan.

The Birmingham and Southfield plan will permit unlimited calls after 6 p.m. daily and all day Sundays, Thanksgiving, Christmas and New Year's day. Regular charges will apply to calls made at other times to telephones in the Metropolitan Area. Proposed rate for this plan is $10.50.

In Farmington and Plymouth, the plan will allow subscribers four hours of calling a month to telephones in the Metropolitan Area outside their local calling territory. The four hours could be at any time, any day of the week, during a month. Rate proposed for this service is $9.50. Calls in excess of the four-hour allotment would be charged at the rate of 30 cents for each quarter-hour.

Approve $500,000 Financing For North Carolina Company

North State Telephone Co., High Point, was authorized by the North Carolina Utilities Commission on Feb. 21 to issue and sell $500,000 in 25-year, 5½ per cent sinking fund notes to finance expansion.

The notes are to be sold to the Philadelphia (Pa.) Life Insurance Co. and the Kansas City (Mo.) Life Insurance Co.

The North State company, which serves High Point, Thomasville, and Randleman, told the commission it had spent 6 million dollars in expanding its service from 17,710 stations 10 years ago to 36,304 now, and that more money is needed to fill 237 applications for service and for increased toll facilities.

OK Rates, Base Area, Service Charges in Nebraska

On Feb. 17, the Nebraska Railway Commission granted permission to J. E. Pingel and Meta Pingel, doing business as the Hoskins Telephone Co., to establish a general exchange tariff, extension telephone rates, a base rate area, charges for service stations, lines and mileage charges.

•

The Cozad Telephone Co. has received permission to establish rates for a push-button console.

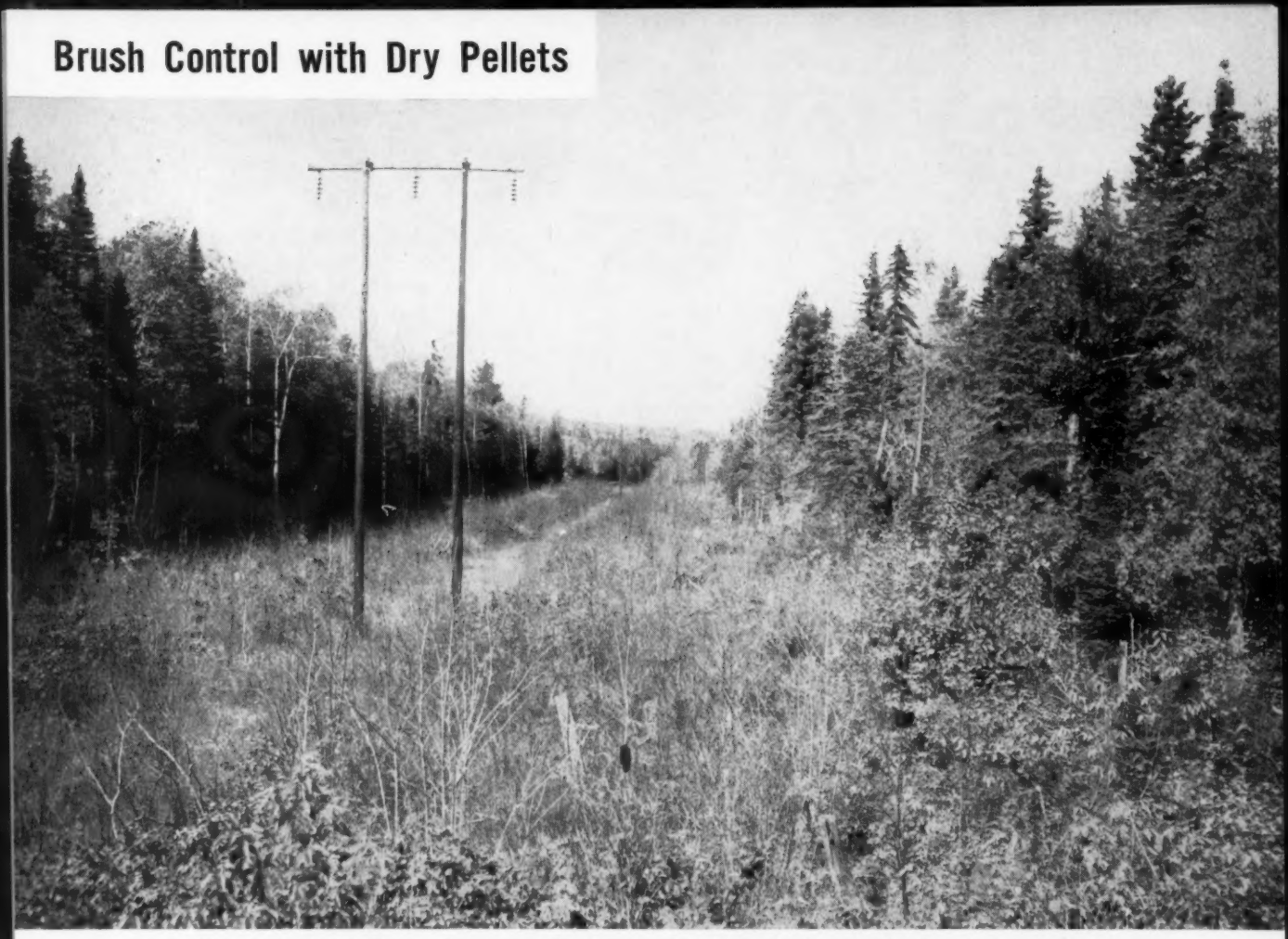
Vermont House Approves Toll Call Fraud Bill

The Vermont House of Representatives has approved a bill to set a penalty on fraudulent use of telecommunications systems.

The measure, sponsored by Rep. Robert Dow of Ludlow, sets a maximum fine of $500 and six months in jail for fraudulent use of telephones, telegraph and television.

Representative Dow said his proposal was designed to eliminate use of prearranged code schemes in making long distance telephone calls, by having a call charged to a wrong or non-existent number and other "tricks, strategems

Brush Control with Dry Pellets



This Maine Public Service Company right-of-way was cleared of conifers and hardwoods by pellets of Du Pont "Dybar"—scattered by six men walking abreast who carried the chemical in 10-lb. pails.

How Du Pont DYBAR® saved $13 an acre chemical cost and 50% application time for Maine Public Service Co.

FENURON WEED AND BRUSH KILLER

"We compared dry pellets of 'Dybar' with a basal stem spray application of a hormone brush killer in oil while working on brush control for the Maine Public Service Company," says Robert N. Smith* of Gould and Smith, Inc., Presque Isle, Maine. "The brush was eight to fifteen feet high; the terrain rugged.

"Six men carrying pails of 'Dybar' applied it in an area twice as wide as that covered by a spray team of four men. The team could barely keep up with the men spreading 'Dybar'. The pellet application was twice as fast as the spraying—cleaner to work with, easier to carry and odorless. We also found it easier to keep track of the amount of chemical being applied—and no mechanical equipment and cleanup were needed.

"When we applied 'Dybar', it cost $50 per acre and $63 for the other brush killer, a saving of $13 per acre. The big saving, however, came from efficiency—the pellets going on twice as fast in comparable terrain.

"Results? We found that 50 lbs. of 'Dybar' performed as well as 100 gal. of basal spray mixture—initial kill was about equal, and 'Dybar' gave better control of conifers, as well as deciduous trees. We expect a three-year killing effect resulting in fewer misses."

Use "Dybar" in your brush control program for similar results. "Dybar" kills slowly, but surely, through the roots, yet is non-flammable, non-volatile, non-corrosive and low in toxicity to humans and animals.

Where foliage spraying of brush is desired, use "Ammate" X for maximum safety near sensitive crops. You can use "Ammate" X on rights-of-way, even when they adjoin cropland planted to vapor-sensitive crops. "Ammate" X is non-volatile, long-lasting, low in cost—low in toxicity to livestock or wildlife.

For more information, write for booklet showing results of applications of Du Pont Weed and Brush Killers. E. I. du Pont de Nemours & Co. (Inc.), Industrial and Biochemicals Dept., Room 2543-N, Wilmington 98, Delaware.

**From "Application of 'Dybar' to a Right-of-Way in Northern Maine", Northeast Weed Control Conference Proceedings—1960.*

On all chemicals follow labeling instructions and warnings carefully.

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

DYBAR® fenuron weed and brush killer · **AMMATE® X** weed and brush killer

and false statements" in the use of telephones and other communications.

(For other states which have such legislation under consideration, see TELEPHONY, Feb. 18, Feb. 4.)

N. C. Company Granted Raise To Permit Continued Service

The Pinebluff Telephone Co. was authorized by the North Carolina Utilities Commission on Feb. 22 to increase its rates to bring in an additional $6,105 a year (TELEPHONY, Dec. 10, 1960).

The commission order said the increase will make the company's rates "among the highest for such service in the state" but that without the additional revenue the company, which has only some 356 subscribers, would be unable to continue operations.

The company, in its rate request, had stated that it operated at a deficit of $2,913.65 during the first nine months of last year.

Oregon Lineman Electrocuted In Joint Use Accident

Jack Miller, 26, a lineman for the Sunnyside (Ore.) Telephone Co., was electrocuted on Feb. 10 when a freak accident put him in contact with a 12,500-volt power line.

Mr. Miller was one of a crew pulling telephone company wire over joint-occupancy poles in Lafayette that the Sunnyside company uses with the Portland General Electric Co.

One of the large coils in the wire being taken off the spool broke loose, according to the report, and was flipped high into the air, making contact with Portland Electric's high voltage line. Mr. Miller was on the other end of the loose coil.

He is survived by his widow, who lives in Lafayette.

United Utilities System Issues 1960 Earnings Report

United Utilities, Inc. has reported that preliminary 1960 earnings available to the common stock were $6,154,000, as compared to $4,921,303 in 1959.

On the basis of 2,545,364 average number of shares outstanding, the earnings were equal to $2.42 a share, compared with $2.09 a share on a smaller capitalization of 2,350,378 average shares.

Total operating revenues amounted to $45,157,000 as against $42,442,240 in the preceding year.

Asks EAS, Raise in Wis.

The Wisconsin Public Service Commission on Feb. 28 was to have heard the application of the General Telephone Co. of Wisconsin, Madison, for authority to furnish extended area service between its Mapleton exchange and the Oconomowoc exchange of the Wisconsin Telephone Co. General of Wisconsin also seeks to increase rates for the EAS.

Second London-Kenya Link

A second radio-telephone channel has been provided from London to Nairobi,

REA OK's Four More Loans

Loans totaling $1,724,000 have been approved by the Rural Electrification Administration as follows:

Blackfoot Telephone Cooperative, Missoula, Mont.; $148,000; Feb. 14.

With these funds, the cooperative will be helped to furnish initial service to 193 subscribers. To provide this service, the borrower will acquire five miles of toll line now owned and operated by the Mountain States Telephone & Telegraph Co., and 17 miles of line now operated by the U. S. Forest Service.

Construction planned includes a new dial central office at Seeley Lake. The borrower proposes to continue service to the three fire lookout stations now served by the Forest Service and to provide new service in that portion of the system.

REA loans to Blackfoot Telephone are helping to benefit 1,157 subscribers. When complete, the system will consist of six exchanges, four of which now furnish dial service to approximately 560 subscribers.

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Mid-Century Telephone Cooperative, Canton, Ill.; $483,000; Feb. 17.

This loan will be used to help improve service for 708 subscribers and furnish initial service to 206 subscribers. There will also be some service in fringe areas. The subscribers who will receive the improved service are now served through the magneto and common battery facilities of the Williamsfield Mutual Telephone Co. and the Fairview Central Telephone Co. The borrower proposes to acquire these systems and convert them to dial operation.

Planned new construction includes dial central offices at both Fairview and Williamsfield.

REA loans to Mid-Century will help enable it to furnish new and improved service to 3,199 subscribers. The completed system will consist of 10 exchanges. Seven of them now furnish dial service to approximately 1,610 subscribers.

•

Surry Telephone Membership Corp., Dobson, N. C.; $353,000; Feb. 17.

With these and funds from prior loans the company will be aided to construct facilities to serve 428 new subscribers; build new headquarters facilities near Dobson; and complete the authorized system. A small portion of the loan will be used to install radio-telephone communications equipment for system maintenance.

Loans to this borrower will benefit 2,315 subscribers. The four exchanges of the system are now furnishing dial service to approximately 1,550 subscribers.

•

Bear River Telephone Co., Tremonton, Utah; $740,000; Feb. 17.

The company proposes to use the loan funds in four ways:

(1) To furnish initial service to 424 subscribers.
(2) To install new exchange at Lampo to replace the existing PABX board at the Thiokol Chemical Co. The new exchange will be located in one of the Thiokol company buildings, and will serve 2,475 extensions.
(3) To construct a new commercial office-garage building in Tremonton.
(4) To complete the previously authorized system.

REA loans to the Bear River company will help enable it to bring new and improved service to 2,751 subscribers. The completed system will consist of five exchanges of which four now furnish dial service to approximately 2,230 subscribers.

compare cost, design and installation time

ACHIEVERFONE

AChieverfone combines low cost, reliability, advanced design and fast installation, giving you and your customers the most outstanding mobile radiotelephone on the market.

Start with cost. Instead of three or more units, AChieverfone has only two units: the control head and the R-T unit. This means AChieverfone costs less than other systems.

Next, take design. AChieverfone is as modern and attractive as today's newest home telephones making MRS more appealing to your subscribers.

Finally, consider installation time. AChieverfone can be installed in just two hours. Only eight screws are required to mount the two units. The interconnecting cabling is plugged into these two units, thus eliminating tedious wiring in the vehicle.

These facts make AChieverfone the best common carrier MRS system you can buy. For more information write or call AC today.

SPECIFICATIONS—FCC Type Accepted

Transmitter: 144-174 Mc, 4-Channel
RF output: 22.5 watts into 52 ohm load

Receiver: 144-174 Mc, 4-Channel
Wide Band (60kc) or Narrow Band (30kc) models available (Bands quickly converted to Narrow or Wide by substituting IF filter)

Frequency Stability: within 0.0005%

Selective Signaling: 51,000 five-digit (compatible, 2-tone sequential) codes available

Size: Receiver-Transmitter, 21⅛" x 8⅞" x 6¼"

Weight: 37.25 pounds, including receiver-transmitter, control head and cable

ACHIEVERFONE

An AChievement in Mobile Communications

AC Spark Plug **AC** *The Electronics Division of General Motors*

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Kenya, Mondays to Fridays, because of increased traffic.

Artist Executing WE Mural On Suspended Steel Plates

A huge mural on stainless steel, equivalent to two stories high, is taking shape at the new Western Electric Building in downtown Manhattan.

This mural is an abstract representation suggesting the sweep of communication across time and space. When completed, it will cover a surface of 1,275 square feet. It will extend across two walls of the lobby of the building, which is at 222 Broadway, New York City.

According to Buell Mullen, the artist who originated the technique of putting murals on metal, this is the largest mural of its kind to her knowledge. Several unique problems were encountered in assembling and mounting the surface, which is composed of plates of 10-gauge stainless.

The entire mural, weighing 6,750 pounds, was hung from the lobby ceiling and is not attached to the walls in any way. This avoids all possibility of ripples or bulges in the thin-gauge metal, which might occur through expansion, contraction or slight wall movement, if the mural were rigidly attached. Sixteen hangers were used.

Because the mural measures about 51 feet long by 25 feet high, the artist could perform her work only after the surface was in place. The surface consists of 20 plates, each of which had to be raised into position and held firmly while being joined to its mates. Great care had to be exercised to make the seams as imperceptible as possible.

A special jig, with block-and-tackle arrangement, was built to lift the thin plates, prevent them from buckling and hold them rigid while they were being joined. Epoxy resin cement was the principal fastening agent, with stainless steel screws also used at some points.

Edges of the plates were butted tightly together and cemented to splice plates on the reverse side to create one surface with inconspicuous seams. The narrow splice plates also are stainless steel.

When the steel was finally in position, with protective paper covering its glossy face, Mrs. Mullen transferred her design to full-scale, using charcoal on the paper. By means of cutting tools, the artist then engraved the design in the steel itself.

With the technique devised by Mrs. Mullen, who has executed many murals on steel for public buildings and private industry, every part of the surface that is to be painted must be roughened or undercut by vibrating tools, or grinding wheels, to make a mechanical bond. She paints with epoxy resins, which are available in a range of colors and provide virtually permanent adhesion to the roughened steel.

Electrical waves, oscillograph recordings, suggestions of radar beams and space patterns have been incorporated in Mrs. Mullen's design for the Western Electric mural.

About 3,000 employes of the Bell System's manufacturing and supply unit will work in Western Electric's 31-story office building. It will be ready for initial occupancy in April.

Receiving a pendant and a company citation for "A dedication to service in telephony's finest tradition," is Mrs. Mildred Davis, center, chief operator at Liberty, Pa., for Commonwealth Telephone Co., Dallas, Pa. With Mrs. Davis are, left to right, her great grand-daughter, Sheryl Hunt; Col. H. H. Butler, Commonwealth company vice president; Betty Hutchinson, traffic supervisor and Dan Chapman, general commercial superintendent. In the early morning of Dec. 29, Mrs. Davis twice received calls for help from Mrs. Robert Cochran. Mrs. Cochran pleaded that "the family is ill, and I don't know why." Twice, Mrs. Davis was unable to reach a doctor, but on the third call from Mrs. Cochran, Mrs. Davis took matters into her own hands, and called the Blossburg Firemen's Ambulance. Two ambulances, responding to the call, found Mrs. Cochran, her husband, and three children, 10, 9 and 7, near death from carbon monoxide gas from a defective furnace. Oxygen was administered by the ambulance crews and following hospitalization, all members of the family were saved.

Strader Safety Director At General Telephone of Ky.

F. Vaughn Strader has been appointed safety director for General Telephone Co. of Kentucky. His appointment was announced by Gordon Saunders, operating vice president of the company.

Mr. Strader was formerly assigned to the general engineering department as a field engineer. He joined the company in 1956 as an engineering assistant. Prior to his association with General Telephone, he had extensive experience in highway construction and traffic control with the Kentucky Department of Highways.

In this new assignment, Mr. Strader is responsible for the coordination of the company's safety program with the activities of all departments. He reports to the operating vice president.

Mr. Saunders also announced that R. S. Cornish Sr., former safety director, had been reassigned to the position of plant training instructor. In the new training assignment, Mr. Cornish will make available his more than 42 years of telephone plant experience with General Telephone Co. of Kentucky and its predecessor companies.

General of Kentucky Names Plant, Marketing Heads

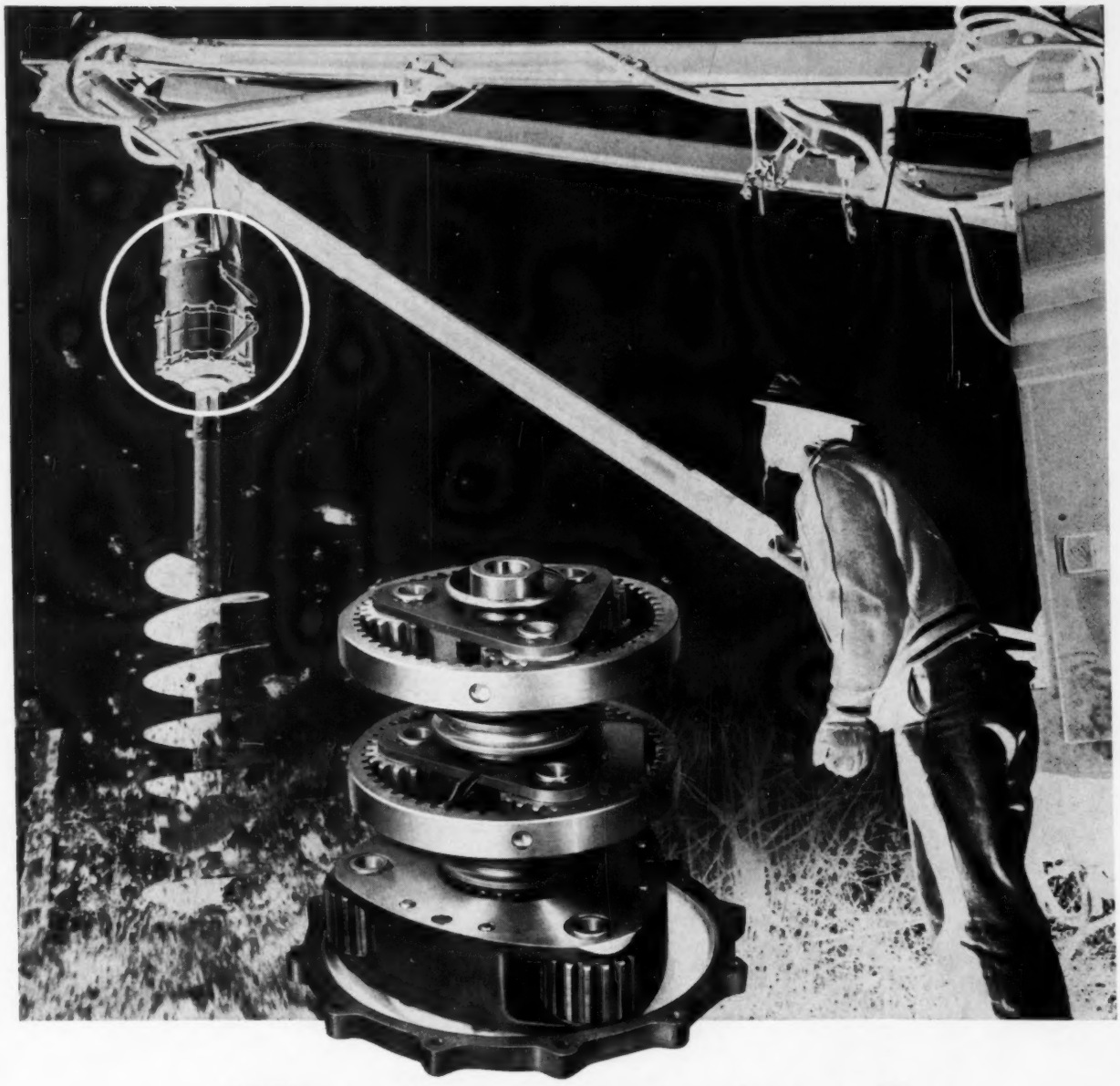
J. M. Stimson has been appointed general plant manager and Alfred R. Schriefer, marketing and sales manager, of General Telephone Co. of Kentucky, Lexington.

Mr. Stimson has been with the General Telephone System since 1946. Prior to his present appointment, he had been General of Kentucky's marketing and sales manager, a position he had held since last April.

Mr. Schriefer was formerly Erie unit sales manager with General Telephone Co. of Pennsylvania.

Indiana Convention Change

The Indiana Telephone Association's convention will be held on May 10 and 11 at the Claypool Hotel, Indianapolis, instead of on May 9, 10 and 11 as previously listed.



What goes on in here?

It's what goes on inside the compact housing of Holan's 5400 Earth Borer that makes it the most powerful derrick-suspended digger in the field.

It's here that Holan's exclusive planetary "gear train" takes power from the hydraulic motor and harnesses it for the toughest digging.

The first and second planets are engaged for normal digging. The third planet is added to the "train" for boring in frozen or rocky soil — enabling the digger to develop 8,400 pounds of torque.

Two levers operate the gears. For spin speed, only the first planet is engaged by pulling up the speed selection lever with a lanyard. When released, a spring-loaded shifting fork returns the borer to two-planet operation for normal digging. The high-torque planet is engaged to work with the first and second planets by a second shifting fork located lower on the housing.

Holan's "gear train" use of the planetary system gives you fast spin, normal digging, and 8,400 pounds of torque with augers up to 30" — all in the same digger. And it can be used on any Holan derrick except the Model 25C.

Look into the 5400 (patents applied for) before you buy any digger. Write us — or call your Holan Field Representative — for complete details.

Holan Corporation, 4100 West 150th Street, Cleveland 35, Ohio

Holan

Subsidiary of THE OHIO BRASS COMPANY

HOLAN

IN THE NATION'S CAPITAL

Continued from page 18

the first conducted over the air. Congress has never ruled on the question of pay-television. But in 1959 it set down conditions for public pay-TV trials by television stations.

Typewriter Phonetic Spelling

Radio Corp. of America obtained patents in Washington, D. C., on Feb. 10 for a phonetic typewriter. The machine takes dictation through a microphone and turns it into type, syllable by syllable. As the machine puts down just what it hears, the output is clear enough in meaning but is not orthodox in spelling. It is suitable for notes to be filed and for interoffice correspondence, but without further transcription might mystify a stranger.

The inventors are Dr. Harry F. Olson, director of the RCA Acoustical & Electromechanical Laboratory at Princeton, N. J., and Herbert Belar, an associate. Their first experimental model could recognize 10 syllables; a current model has a vocabulary of 100. The first practical application is expected to be in simple forms through which (1) vocal orders can be given to machinery or (2) a limited number of terms can be fed into a computer.

"Two thousand syllables would cover the English language," said Dr. Olson. "What we are trying to do now is determine what the components of speech are that carry the information we want."

One of the patents gives the following example of the way pseudo-phonetic speech would appear in type:

"The ultimit object is too develup a tipriter which tips in response too wurds spoken intoo a mikrophon the outpoot being imediatli legibl and usabl for intro ofis wurk filing and eventual transkripshun intoo konvenshunal leters."

The equipment consists of a microphone, a cabinet containing the speech analysis mechanism, and an electric typewriter. A code stored in the machine is linked to the keys of the typewriter. The machine listens to each sound spoken into the microphone, codes it, and when it matches any symbol in the stored code the corresponding keys are struck.

House Rules Committee Fracas

The unseemly scrambling which has been going on in the House Rules Committee, this past week, points up how thin is the veneer of "liberalism" (and "conservatism" as well) when the political chips are down. As most readers already know from their daily newspapers, the Kennedy administration won a very close but important victory when the proposal to enlarge the House Rules Committee was approved by the narrow margin of five votes.

Self-professed liberals of all varieties hailed this verdict as a great triumph, freeing the lower chamber of Congress from enslavement by a conservative-ridden group which has bottled up "liberal" legislation for years and years. Thanks to this great victory, the rank and file of the House membership would now be able to vote on these measures because they would henceforth be promptly cleared for floor action. Of course, this verdict could never have been won without the strong personal support of House Speaker Rayburn.

But that arch conservative, Rep. Howard Smith (D. Va.), chairman of the House Rules Committee, still had some more cards up his sleeve. During the debate on the change, Smith plainly indicated his belief that the real purpose of the administration was to pack the committee for its own type of legislation and not break down Rules Committee barriers indiscriminately. Subsequent events have proven Smith quite right. The purpose of packing the committee (a blunt word for enlargement) was not so much to clear the deck for legislative action as to grab the control away from Smith and put it in the hands of Rayburn who appointed the new committee members.

To prove this, Chairman Smith resorted to a sort of ideological flip-flop of his own. He went through the pile of bills he has been accused of "blocking," and found that they were not all liberal by any means. Some were, of course, but several were simply bills which were obnoxious to House Speaker Rayburn. Until the Rules fight, Smith had always been most considerate of the Speaker's wishes in bringing up or clearing bills for floor action. Since then he seems to be going in the other direction.

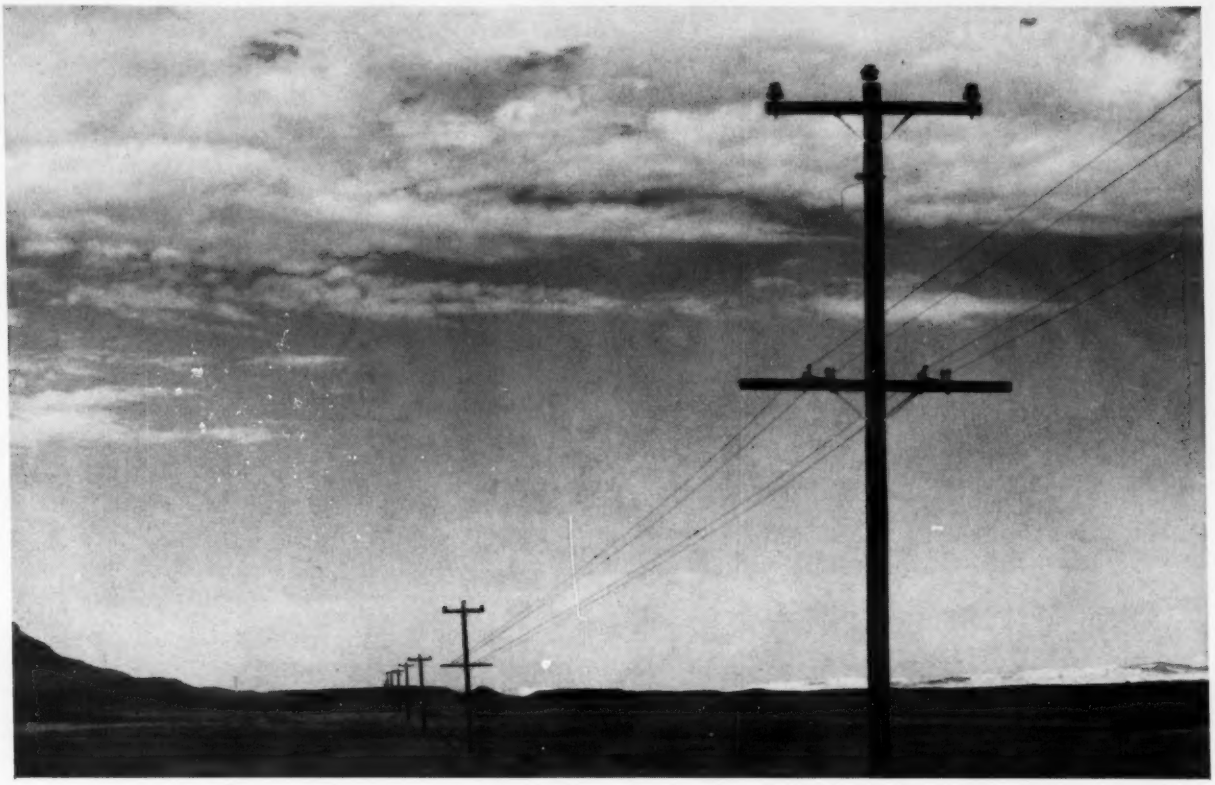
One of the bills to which Rayburn was particularly hostile was the bill to allow House proceedings to be televised. Another was a bill to set up a joint House-Senate committee to study "a national fuels policy." This perennial bill has been sought by the depressed coal mine area Representatives, but the oil and gas interests charge it is an effort to steal their market by unfair federal limitations. Speaker Rayburn, coming as he does from oil- and gas-producing country, was never enthusiastic about this "national fuels policy" bill and heretofore has always managed to squelch it—via the Rules Committee.

But both of these bills—congressional TV and fuels policy—might be roughly classified as "liberal." One would bring closer to the American public—via TV—a better view, if not a better understanding, of how their Congressmen are conducting themselves in Washington. The other could disclose the relative advantages and disadvantages of competitive fuels—oil, gas, and coal—used by the public for space heating in their homes.

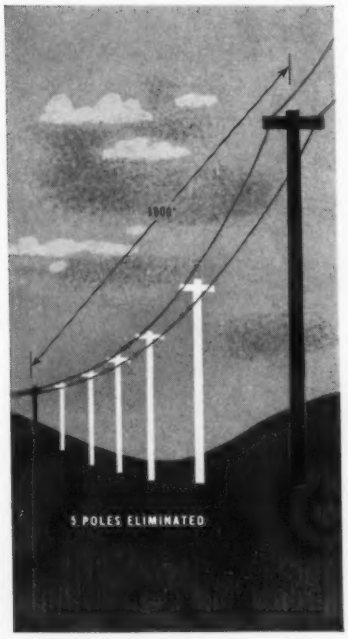
When the controversial congressional TV bill was called up, however, an amazing thing happened. The "liberals" on the committee—who were hollering so loud a couple of weeks ago about the "solemn right" of the House membership to have a chance to vote on legislation—cast their ballots to bottle it in the Rules Committee. Chairman Smith, and the conservative Democrats, voted to allow the measure to go to the floor for a vote. They lost by a narrow margin.

Who won then—liberalism or simply power politics? Speaker Rayburn got off with a 50-50 victory on the fuels bill when the committee voted to cut the measure down to a simple House committee action instead of a concurrent project with the Senate. They then cleared it for floor action.

There will be more of these tests. And the outlook is quite uncertain not only in the Rules Committee but even on the floor. In the past, the Rules Committee has served as a convenient "deep freeze" for Congressmen to blame (or praise) for holding up critical bills on which they did not care to commit themselves. Under Smith's new policy almost everything for floor action, the liberals themselves will have to run for cover in the Rules Committee to shut off measures which they dare not allow to go to a floor vote. One of these is the so-called "anti-backdoor financing" bill which would put an end to various



NS SPECIAL 080-25 COPPERPLY® gives greatest economy for joint pole installation



NS SPECIAL 080-25 COPPERPLY also makes possible long-span installation up to 1900 ft. on communications installations, using insulated wire and special construction design.

Now you can string Special 080-25 COPPERPLY jointly with power lines at about half the cost of previous conductors suitable for such installations.

When you substitute Special 080-25 for iron wire or for .102-30 EHS copper-coated wire on joint construction, you get maximum service flexibility at less cost. Extra strength of Special 080-25 means it can be strung to 540 foot spans in heavy loading districts, although practical application to avoid mid-span hits would normally limit span lengths to approximately 430 feet when used bare.

ADDED ADVANTAGES—with Special 080-25 COPPERPLY you get these added advantages:

- **Carrier Capability**—four mils of concentric copper coating assures excellent carrier transmission
- **Economy**—installed cost per mile is approximately equal to galvanized wire, grade 135
- **High Strength/Low Weight**—with a breaking strength of 1325 lbs., weight of 92.4 lbs. per mile, Special 080-25 provides a greater strength-to-weight ratio

For the complete story on Special 080-25 COPPERPLY and other standard sizes, contact National-Standard Company, Niles, Michigan C-61-3

NS NATIONAL-STANDARD COMPANY

NATIONAL-STANDARD COMPANY
Niles, Michigan

devices whereby federal spending and lending agencies can "carry over" from session to session, or stash away in "revolving funds," unexpended appropriations without going to Congress for new spending or lending authority each year.

Probably the more doctrinaire liberals see no inconsistency in this, because to them the left is always right and the right is always wrong, no matter what expediency is necessary to uphold one and defeat the other. To them a vote to bottle up a conservative bill which Congress might otherwise pass would not be difficult at all. But to the more moderate variety of liberal it must come as a gagging or galling thing to vote to block any kind of a measure—liberal or conservative—after doing so much sermonizing about the solemn right of the House membership to vote on any reasonable measure introduced and reported out as approved by other House committees.

Lincoln (Neb.) T&T Moves Toward Complete ANC

All Number Calling (ANC) will be adopted in the Lincoln exchange of the Lincoln (Neb.) Telephone & Telegraph Co. Changes to numbers with seven numerals will be made on a gradual basis from Mar. 1 this year as orders are issued for installations, moves and changes of listings. The Dec. 1 directory will carry both types of numbers with all numbers being changed in the Dec. 1, 1962 directory. Lincoln has 68,478 stations.

Changes to ANC were made by LT&T last year at Sutton, Friend, Cordova, Dorchester, Union, Bennet, Davey, Denton, Greenwood, Huskerville, Malcolm, Pleasant Dale, Raymond, and Waverly. This year, changes will be made at Murray, Wilber, Clatonia, Adams, Ashland, Milford, Elmwood, Unadilla, Nehawka, Benedict, Gresham, Syracuse, Bradshaw, and Daykin.

The company announces that seven numerals will be used for future dial conversions and replacements of dial central office equipment. LT&T now operates 107 dial and 19 manual exchanges.

11 New Electronics Courses Offered by ICS in 1961

Joseph A. Risse, director, school of electronics of the International Correspondence Schools, has announced that of the 250 standard ICS home-study courses for individual and industrial training being offered in 1961, 25 are electronics courses. Eleven of these are new in 1961.

Mr. Risse states the electronics courses range from a short course on electronic fundamentals to electrical engineering with a special electronics optional section. New 1961 courses cover the fields of:

Radio-electronic telemetry.
Electronic computers.
Ultrasonics.
Mono and hi-fi.
Special sound systems.
Communications technology.
Industrial electronics technology.
First and second class FCC radio-telephone licenses.
Semiconductor transistor circuits.

The ICS electronics school also has introduced 12 completely new instruction texts for 1961, Mr. Risse states. These new texts were written by such experts as W. J. Mayo-Wells, research engineer, National Bureau of Standards, who wrote the ICS text "Radio-Electronic Telemetry;" Allen H. Meitzler, physicist, Bell Telephone Laboratories, who authored the ICS texts on Ultrasonics; and F. K. Walnut, supervisor of customer service publications, Computer Division, Philco Corp., who wrote "Principles of Digital and Analogue Computers."

The ICS general catalog, No. 1125N, which includes descriptions of the electronics courses, may be obtained free by writing ICS, Scranton, Pa.

NTCA Elects Officers; Urges Excise Tax Repeal

James L. Bass of Carthage, Tex., has been elected president of the National Telephone Cooperative Association. Mr. Bass, an attorney and businessman, was named at the association's convention, held Feb. 9 through 11 in Dallas, Texas.

Other officers are: Vice president, Leo Forrest, manager of the West Texas Telephone Cooperative, Hereford and secretary - treasurer, Maynard Christenson, president of the Dakota Cooperative Telephone Co., Volin, S. D.

The NTCA went on record calling for the elimination of the "discriminatory" 10 per cent federal excise tax on telephone service which "is not paid by other communications."

In another action, the association passed a resolution urging retention of the present 2 per cent interest rate on Rural Electrification Administration loans made to electric and telephone cooperatives.

It was also charged at the convention that REA funds have been used to improve small telephone systems, which later have been sold at a profit.

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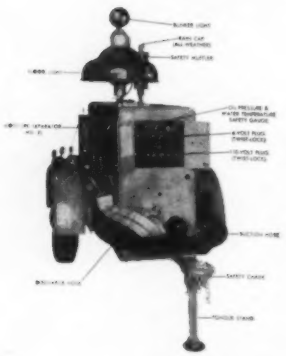

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Motley Calls For 3-Point Insurance Program for Aged

Arthur H. Motley, president of the Chamber of Commerce of the United States and publisher of *Parade* magazine, speaking at a luncheon meeting of the Health Insurance Association of America, on Feb. 14, called for a three-point program by the insurance industry to improve health insurance for the aged.

Mr. Motley urged the insurance industry to take the following steps:

(1) Package pensions and life and health insurance together in order to reduce premiums paid by employers and employes.

(2) Set up health insurance plans (along the lines of some life insurance plans) that employes can fully pay up during working years before retirement.

(3) Help businesses make their group health insurance plans available to all of their retired employes.

He also urged support for the medical aid program passed last summer by Congress. Under this program, states can improve their medical care plans for the low-income aged. The federal government pays 50 to 80 per cent of costs. "It is part of our over-all job of making sure that the best possible medical care is available to all of our citizens," he said. "The point is that the job must be done."

The Chamber's chief executive summed up the responsibilities of the insurance industry, the medical profession, and the business community in this way:

"Every individual should have the right to choose how he will spend his own money, and this right should be vigorously defended. As to insurance, he should have the right to decide whether or not to purchase insurance, or to use other means of protecting himself against the hazards of sickness.

"It is the function of the insurance industry, the Blue Cross, Blue Shield, and other voluntary mechanisms to make available to the public, insurance which will furnish the protection against the hazards of sickness; to do everything possible to make the availability of this protection generally known to the public; and to promote its widest possible use.

"Employers have a great responsibility for making voluntary health insurance available to their employes and their dependents under a group insurance program.

"It is one of the considerations which make a company a good place to work and tend not only to keep good employes, but to create a reputation that attracts a better class of new employes.

"Hospital, surgical, medical expense coverage has become almost a 'must' in any well-rounded employer-employe group insurance program.

"Catastrophe coverage is now generally recognized as an essential part of any well-rounded group insurance program, and employers, quite generally, are including it as part of their employe group insurance programs."

Speaking on his three-point program, Mr. Motley added, "Employers have been quick to recognize the value of making group health insurance protection available to retired employes and their dependents.

"The National Chamber has strongly recommended the idea," he said. "The response to the Chamber's appeal has indicated a wide-spread interest. It showed that many of the more progressive employers had already taken advantage of this opportunity. Many others were interested and studying it.

"A few employers have assumed the entire cost of this additional protection. Some have shared the cost with their retired employes; in other cases, the coverage has been made available under the group program, but with the cost paid by the retired employes."

Summing up on post-retirement insurance, Mr. Motley said, "It seems to

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me that some way must be found whereby the cost of this post-retirement health insurance can be paid for during the working years of the employe, so that after retirement he is entirely free from this burden.

"I should think that wouldn't offer any great difficulty, now that it is generally recognized by employers and employes that they will need this protection even more in their later years when their ability to pay for it is reduced."

Mr. Motley recalled that pension plans and group life insurance were common benefit programs, even before health insurance came along. He raised the questions of whether it shouldn't be possible to offer these three closely-related, and highly essential, forms of employe protection in a single package at a reduced cost.

He said, "I've heard a great deal in recent years about the combining of life insurance companies with property and casualty insurance companies, and about some of the package policies which have been developed."

The Chamber of Commerce head wonders why it wouldn't be equally feasible to combine pensions, group life insurance, and group health insurance into a single package, cut the sales cost, the cost of administering it, and reduce the premium paid by the employer and the employe.

"If the voluntary system is going to continue to meet the needs of the people for health care, including the needs of our older citizens," Mr. Motley concluded, "then it is up to all of us to take a long, hard look at our system and make sure that it does the job."

Rothman Comptometer Sales Manager to Independents

The appointment of Ralph E. Rothman as sales manager of Independent telephone industry sales for the Electrowriter Sales Division of Comptometer Corp. has been announced by general sales manager, James G. Johnson.

Mr. Rothman was formerly with the General Cable Corp. as assistant sales manager of Independent telephone company sales. Prior to that, he was southwestern regional sales manager for General Cable.

He is a major in the Marine Corps Reserve, and flies periodically from the Glenview (Ill.) Naval Air Station.

During World War II, Mr. Rothman flew fighter planes in the South Pacific.

In the Korean conflict he piloted transports.

R. E. ROTHMAN

He is a graduate in mechanical engineering from Texas A & M College.

S. D. Mayor Manager Takes Leave For Dial Training

"Believe me, I left things in good hands," said the youngish mayor of Baltic, S. D. "The village board will keep the place running smoothly."

Bennie Romsdahl, who doubles as mayor of Baltic (just north of Sioux Falls), and as a successful telephone manager, was speaking at the Stromberg-Carlson XY Dial Training School in Rochester, N. Y. His community duties had to take second place while he was attending this six-week course.

Mr. Romsdahl was elected in 1960, too late to pull "double duty" both as mayor, and as telephone manager when the Baltic Cooperative Telephone Co., held cut-over ceremonies. The Baltic office was converted to dial in 1956.

"The movement away from the larger cities to nearby smaller towns has certainly been felt in Baltic," Mr. Romsdahl stated. "Station count at the telephone office has been increasing, partly because our town has voted in a number of civic improvements to make it more attractive to 'city folk'."

Bennie Romsdahl, who doubles as town mayor and as manager of the Baltic, S. D., Cooperative Telephone Co., took time out from his mayoral duties and attended the Stromberg-Carlson Dial Training School in Rochester, N. Y. for six weeks. Here, he works on a telephone circuit diagram.

Mr. Romsdahl has been connected with the telephone business for 12 years, the last six in Baltic. His first experience in the industry was gained in Bryant, S. D., when he worked in an exchange after school hours.

He was a student in the 52nd Stromberg-Carlson XY dial class. When the class completed its work, a total of 1,486 telephone men and women had been trained there in the operation and maintenance of the XY dial system.

Bogart Sales Promotion Head For Preformed Products

Douglas K. Bogart has been appointed sales promotion manager of Preformed Line Products Co., according to Edmund H. Brown, vice president-sales.

D. K. BOGART

For the past 10 years, Mr. Bogart has been engaged in creative and administrative phases of advertising, merchandising and sales promotion for various Cleveland companies, including the Bryant Heater Division of American Steel & Wire Co., and the Reliance Electric & Engineering Co.

After 34 months in Europe with the U. S. Army Air Force during World War II, he attended Fenn College, School of Business Administration, Cleveland, as a marketing major and was graduated in 1949.

Times Make the Man

"Some are born great, some achieve greatness, and some have greatness thrust upon them."—SHAKESPEARE.

SUBMERGED REPEATER

Continued from page 34

this fact is used in one method of testing the condition of the repeater from the shore terminal.

Duplication of some components is necessary so that the failure of a component in one half-amplifier does not adversely affect the other half.

In the repeaters manufactured for systems prior to the U.K.-Sweden system, a supervisory doubler unit is used for checking the performance of the cable and repeaters from the shore terminal station. A supervisory tone in the low-group band is sent from the terminal station; the frequency chosen is peculiar to one repeater. This tone is doubled in frequency by the supervisory unit for which it was intended; and, as the doubled frequency lies in the high-group band, it returns to the originating terminal. As the original level and the received level are known, a measure of system performance can be made, up to and including, the repeater in question.

The more modern repeaters contain more sophisticated supervisory equipment, since the latest cable systems contain a large number of repeaters, and the earlier double-circuit arrangement does not give sufficient testing channels. The new system also allows the source of a noise fault to be traced—a facility not previously available.

Submerged Equalizers

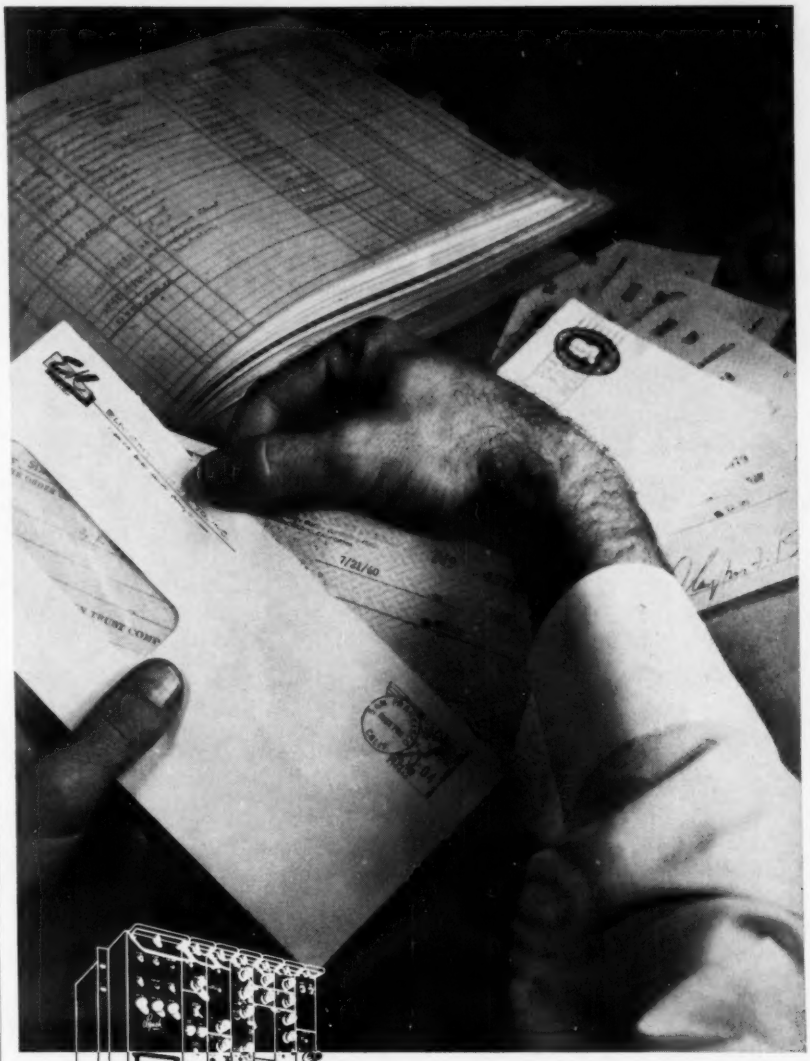
Submerged repeaters contain units designed to equalize fixed lengths of cable of the last known characteristics at the time of manufacture of the repeater.

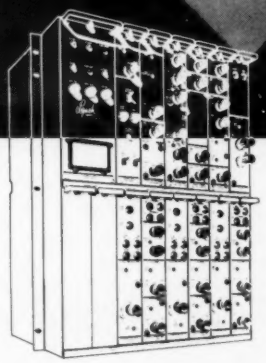
As the characteristics of the actual cable, as laid, may differ from these design values, additional and separate equalizers have to be inserted in the cable to counter this cumulative error on long routes.

Submerged equalizers manufactured by Standard Telephones & Cables are inserted into special demountable housings so that adjustment can be made on board the cable-laying ship. The adjustments are made in an air-conditioned room where the techniques used are similar to those used in repeater manufacture.

A continuous check is made on the system as it is laid so that the next submerged equalizer can be designed and sealed up in advance, by interpolating the results obtained.

On the COMPAC system, between Canada and Australia, more than 300 British repeaters and 30 equalizers will handle 80 high-quality telephone cir-





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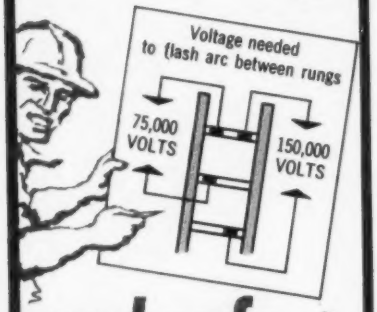

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Arkansas Company Fills Growing Service Needs

The residents of Ola, Plainview, Danville, Havana and Bellville, small Arkansas towns nestling in the heart of the rich Arkansas River Valley area, caught their first glimpse of one of their future outstanding citizens in 1939 when Omer Sanders, along with his wife and two small children, came to inspect the telephone properties they had purchased.

And Mr. Sanders' dream—to serve the subscribers of the Yell County Telephone Co., Inc. with efficient communications — was realized last January when he converted the last of his exchanges to dial. Ola, which now has 240 stations, is expected to grow soon into 400 stations with extensive rural additions, and the entire Yell County system of 1400 stations will bear no resemblance to the 1939 system.

Through the intervening years, Omer, his wife, Ethel, and their son and daughter contributed their time and energy to the communities, and especially to the modernization effort that was undertaken in 1957 in Yell County with the demand for service that the birth of Arkansas' broiler industry placed on the company.

Daughter Paula is now gaining experience in the accounting department of Southwestern Bell Telephone Co., and son Todd, who is majoring in accounting at the University of Arkansas, will return to the Yell County company upon graduation.

California is now only a voice away for Ed Isom, the mayor of Ola, as Omer Sanders of the Yell County company, supervises.

Marvin Hill of Stromberg-Carlson presents Ethel Sanders of Yell County Telephone Co., Danville, Ark., with a new telephone for her home. Occasion was the cut-over of the Ola exchange.

The new Ola equipment, 200 lines, 500 terminals, is housed in a concrete-brick veneer fireproof building and offers extended area service to the Plainview exchange, with both of the exchanges trunking toll calls into the Russellville office of Western Arkansas Telephone Co.

As Mayor Ed Isom remarked after making the first call on the new Ola system: "Besides being sincere hard-working people for their company and their communities, the Sanders family represents the type of people we know as real neighbors and friends."

WE Announces Promotions; B. E. Clark Vice President

Beecher H. Clark, central installation manager of Western Electric Co., has been elected a vice president and will head the company's installation organization effective Mar. 1.

In his new position, Mr. Clark will direct a nationwide force of about 14,000 employes who install central office equipment, which the company manufactures for the Bell System.

Mr. Clark was born in New Brunswick, Canada, received his secondary schooling in Portland, Me., and later studied at the University of California.

In other executive changes, the company announced that John J. O'Brien, a manufacturing division vice president headquartered at Indianapolis, will become vice president, finance, on Apr. 1.

Mr. O'Brien will transfer to the finance division on Mar. 1 as vice president, administration, reporting to Charles D. Dugan, who is vice president, finance, and a director of the company. The latter will retire on Mar. 31.

William E. Burke, who is now vice president, installation, will succeed Mr. O'Brien in the manufacturing division post.

Watkins Sales Head, Dierks Wood Treating Division

Frank R. Watkins Jr. has been promoted to sales manager, Wood Treating Division, for Dierks Forests, Inc., at the company's Hot Springs, Ark. office.

F. R. WATKINS JR.

Mr. Watkins, who is a native of Kansas City, Mo., attended the University of Missouri at Columbia.

He began his business career by selling insurance for a short time. He then taught flying at a privately-operated school in Kansas City, later being employed by the Civil Aeronautics Administration as an inspector.

Enlisting in the Army Air Corps, he trained at Randolph Field, Tex. He spent two years as a flight officer delivering supplies over the "hump" in India.

In 1948, Mr. Watkins joined Dierks in the sales department of the Lumber Division. He transferred to the Wood Treating Division in March, 1949.

When the Dierks company's general offices moved from Kansas City to Hot Springs in 1945, Mr. Watkins remained in Kansas City as district sales manager, the position he held prior to his present appointment.

Jorgensen Joins Lenkurt's Microwave Products Group

Wayne H. Jorgensen has joined Lenkurt Electric Co., Inc., San Carlos, Cal., as an electrical engineer in the microwave products project group. He is assigned to video amplifier circuit design.

Before joining Lenkurt, Mr. Jorgensen had been with the Minneapolis-Honeywell Co. as an electrical engineer working on design and development of sonar transponders.

He received his B.S.E.E. from the University of Wisconsin.

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Scene at one of recent Automatic Electric Co. seminars held for members of the Telephone Association of New England (TANE). Despite disagreeable weather and transportation difficulties, 49 telephone men from 26 Independent companies managed to attend the three seminars held successively in Augusta, Me., Concord, N. H., and at Woodstock, Vt. Discussions covered telephone men's problems; telephone opportunities, in general; reference to paystations, and the new types of telephones available for expanded services. Visiting AE engineers were Carl Hulik and Leonard M. Sellig.

Lenkurt Names 2 Engineers To Microwave Project Groups

Lenkurt Electric Co., Inc., has announced two engineering appointments, those of Peter Georgiev as a senior electrical engineer in the advanced development group; and J. Murray Hall, who is assigned to microwave products.

Mr. Georgiev has been assigned to studies of new microwave applications in telecommunications.

He previously was with General Electric Co. at Lynchburg, Va., as a microwave development engineer.

A native of Bulgaria, he received his degree in electrical engineering from the University of Sofia, and was a development engineer for Elprom, Inc., there from 1953 until 1957.

He is a member of the Institute of Radio Engineers.

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J. Murray Hall joined Lenkurt as an electrical engineer, specializing in system and intermediate frequency amplifier design.

Mr. Hall previously had been with Canadian Westinghouse Co., Ltd., at Hamilton, Ontario, for eight years. His work there consisted of circuitry design and project and field engineering.

He received his B.E. in electrical engineering from the University of Saskatchewan, Canada.

Mr. Hall is a member of two Institute of Radio Engineers professional groups—one on circuit theory, and another, on communications.

BELL SYSTEM REPORT

Concluded from page 27

and charges are established under public regulation, are further restricted, as they compete for business, by the excise levy. This, we submit, should not be.

"(3) Despite decades of rising prices, many regulatory bodies have continued to regard property built years ago as worth no more of today's thin dollars than of yesterday's plump ones.

"Also, taxation has followed the theory that depreciation charges to recover investment may not exceed the number of dollars originally invested, even if each dollar recovered is worth less. Today there is growing national awareness that this failure to allow for the decline in the value of the dollar slows up economic progress.

"We believe regulatory bodies should measure today's earnings against today's value of investment, not against cost in yesterday's dollars.

"We also believe the tax laws should permit our business, and every business, to recover in full, through year-by-year depreciation charges, the purchasing power of the dollars originally invested in property. This is the way of progress and we have urged legislative action to achieve it."

General Dynamics Continues Graduate Fellowship Program

The establishment of a General Dynamics/Electronics graduate fellowship in electrical engineering at Syracuse University, and renewal of a similar grant to Cornell University, where a fellowship was established last year, have been announced by James D. McLean, company president.

Each of the fellowships carries a stipend of $2,400, plus full tuition and all fees. The fellowships will be administered by the dean of graduate studies at the two universities.

The General Dynamics/Electronics graduate fellowship in electrical engineering at Cornell this year is held by Joseph W. Douglass Jr., of 21265 Kenwood Ave., Rocky River, O.

In another phase of General Dynamics/Electronics' support of advanced study, Watson F. Walker, assistant

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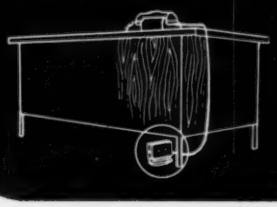

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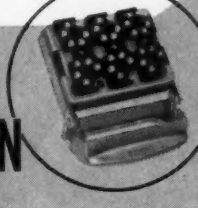

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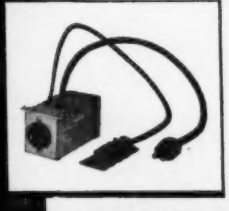

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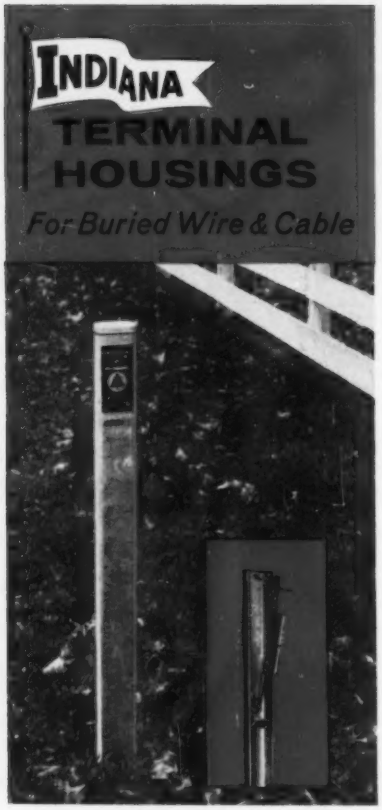

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chief engineer in charge of the navigation laboratory of the Military Products Division, is currently at Syracuse University doing graduate work leading to a doctoral degree in electrical engineering. His tuition, all fees, and partial salary are paid by the company.

Other General Dynamics/Electronics technical personnel are working for doctoral degrees at the Universities of Kansas and Illinois under this same program.

General Dynamics/Electronics is a division of General Dynamics Corp.

A TEST PANEL FOR PRIVATE LINE CIRCUITS

Concluded from page 22

of the subscriber's loop jack. (If using a dc to 20-cycle signaling convertor, reverse the patch cords to ring towards the distant office.)

If your office dial tone is going to a distant subscriber and the dial long-line equipment does not provide talking battery, reverse this connection. These types of dial long-line units are usually identified by their equipment numbers, which are marked on the equipment record cards. The equipment numbers with their connection instructions can be typed and mounted near the test panel.

General Testing Conditions

To Monitor or Talk. Connect a position cord from the nearby testboard into the TALK jack. Operate the position key to monitor or talk. A test handset or loudspeaker equipped with a larger 310 type plug can also be connected to the second TALK jack.

To Ring Toward the Subscriber's Loop. Press the GEN key. This applies generator to the cord in the SUB jack. Reverse the cord and press the GEN key to ring toward the distant terminal or the central office equipment.

To Send and Receive Tones. To test toward the central office, patch test tone into the MEAS jack and turn the TST CO key to the off-normal position (guard lamp lights). An off-hook condition is required on some dial long-line units.

To Test Toward the Subscriber's Loop. Turn the TEST SUB key to the off-normal condition (guard lamp lights). The same conditions apply for receiving tones except, of course, a 600-ohm transmission measuring set will be connected to the MEAS jacks instead of the tone supply. Always compensate for the 0.6 db loss of the matching coil when sending or receiving tones.

To Dial. Connect the position dial cord from the nearby testboard to the DIAL jack. After dialing, leave the cord connected to hold the circuit seized. On some dial long-line circuits, a ground start condition is required before dial tone can be obtained. Press the GRD START key momentarily; when dial tone is heard, the number can be dialed.

If the subscriber tries to use the circuit during the test period, the AI relay in the KTU will operate and provide battery to the subscriber. The operation of the relay also lights the SUPV lamp to indicate the subscriber has lifted the receiver.

Operating the TEST CO or TEST SUB turnkeys opens the circuit, and red capped lamps remain lit while these keys are operated to help remind the tester the circuit is open. The test panel can also be used for preliminary new circuit tests. If the subscriber's loop has not yet been connected, a short circuited plug can be inserted into the subscriber loop jack to close the test coil primary windings.

Sufficient test points, equipment records that are quick and easy to understand, adequate test equipment—these are three requirements that cut employe frustration and boost special circuit maintenance.

Chesapeake Supply Named Distributor For Kwik-Mix

Chesapeake Supply & Equipment Co., Baltimore, Md., has been appointed a distributor for the state of Maryland and parts of Virginia, Delaware, and all of the District of Columbia, by the Kwik-Mix Co., manufacturer of material handling and mixing equipment. Kwik-Mix is a division of Koehring Co.

Chesapeake Supply & Equipment will sell and service the complete line of Kwik-Mix equipment including tilting and non-tilting bituminous mixers, plaster and mortar mixers, Moto-Bug material handlers, and Hi-Lifter four-wheel drive fork trucks.

The company has been a distributor for Ka-Mo Tools, a department of Kwik-Mix Co., for some time. They

Answers to Questions On Page 35

(1) Yes.
(2) No.
(3) Yes.
(4) Yes.
(5) This service had not been provided as of this writing.

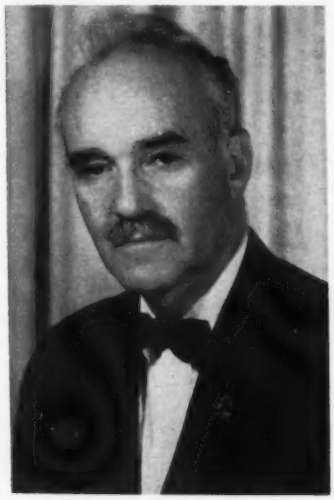
will continue to handle Ka-Mo earth and rock boring equipment.

The new distributor has two branches: 4726 Baltimore Ave., Hyattsville, Md., and Mary and Peir Sts., Dover, Del. Its Baltimore address is 1211 East 25th St.

G. Kinsey Owens is president of the Hyattsville branch, Frank DeBow manager of the Dover branch, and Edward Welch president of the Baltimore location.

Ffolliott New Technical Director, AE International

Charles F. Ffolliott, director, product design, Automatic Electric Laboratories, Inc., has been appointed technical director of Automatic Electric International, Inc., at Geneva, Switzerland, effective Mar. 1.



C. F. FFOLLIOTT

He will succeed Dr. Imre Molnar, who is returning to the United States. Announcement of Dr. Molnar's new duties is expected shortly after his return.

F. E. Wood, formerly supervisor, electromechanical design, will become director of product design, and G. A. Borling, supervisor of relay and switch design, will be assigned Mr. Wood's former position.

Mr. Ffolliott is a graduate of Rensselaer Polytechnic Institute, where he received an E.E. degree in 1927 and an M.S. in 1930.

After three years of teaching and graduate work at Harvard University, he joined Automatic Electric in 1934, as assistant to the chief research engineer.

For the next five years, he devoted much of his time to a comparative study of the technical and economic features of various basic telephone switching systems. He became assistant

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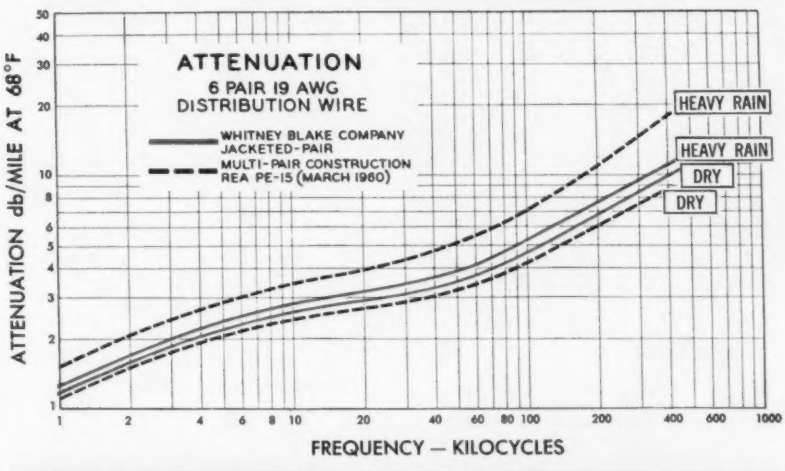

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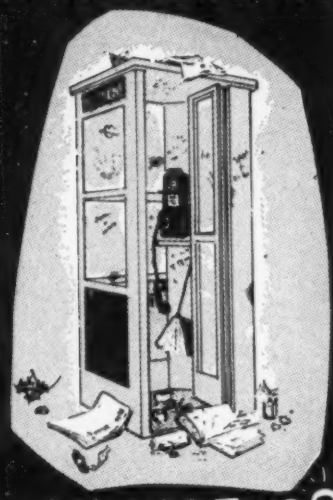

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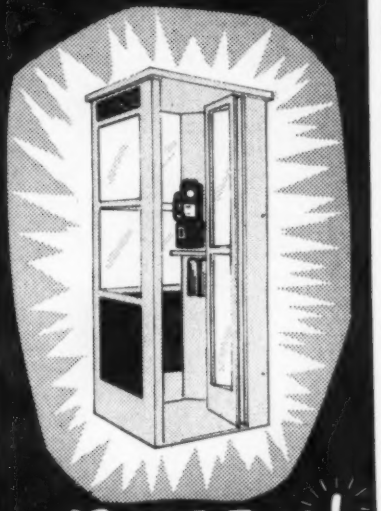

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to the laboratories' president in 1930, technical director in 1940, and director of product design in 1947.

In this position he has been responsible for the development of telephone station apparatus, power, signaling and transmission equipment, relays and switches, recording apparatus, and printed wiring, and has directed all mechanical and environmental testing.

Mr. Wood, a native of Nebraska, received his B.S.M.E. from the University of Nebraska in June, 1930, and joined Automatic Electric on July 1. Beginning as an installer, he soon entered the engineering inspection department, where he was involved in the development of production techniques to improve product quality.

In 1937, Mr. Wood was transferred to the laboratories organization, and two years later he became supervisor of electromechanical design.

In this position he has been responsible for the development of Type 80 and other telephones, and for improvements and new designs in relays, switches, dials, and associated products; his name appears, as sole or coinventor, on 31 patents. In his new position, he will be concerned with all product developments of the laboratories.

Mr. Borling is a graduate of Illinois Institute of Technology, where he received his B.S.E.E. in 1948. Immediately upon graduation he joined Automatic Electric as a student engineer.

In 1950, he was transferred to the laboratories, where he worked directly under Mr. Wood in the development and improvement of switches, relays, ringers, and a wide variety of similar products. Since 1958 he has occupied the position of section leader with specific responsibility for developmental activity in these areas.

Dr. Molnar's association with Automatic Electric began in Europe in 1930 —the same year he received his degree in communication engineering from the University and Institute of Technology in Berlin. He was transferred to the home office of Automatic Electric in 1937, and received his Ph.D. from Northwestern University in 1950.

Dr. Molnar was one of a group of six Americans who in 1959 spent a month inspecting a cross-section of Russian plants and laboratories under the sponsorship of the Electronic Industries Association and the U. S. Department of State.

Prior to his assignment to Automatic's international affiliate in 1959, Dr. Molnar was director of telephone switching systems development in Automatic Electric Laboratories.

De Ferranti, ITT Europe Head, at Brussels Hq.

The appointment of Marc A. de Ferranti as president of ITT Europe, Inc. and as European general manager was announced recently by H. S. Geneen, president of International Telephone & Telegraph Corp.

M. A. DE FERRANTI

As head of ITT Europe, Mr. de Ferranti will make his headquarters in Brussels, Belgium, directing the coordination and expansion of ITT's extensive investment in manufacturing, sales, service and telecommunications operations through Europe, Africa and the Middle East.

He went to ITT from the international group of General Electric Co. where he was most recently on special international assignments for the company. Prior to that, he was general manager of the company's distribution transformer department.

Mr. de Ferranti put into operation and directed General Electric's advanced management program. He also has served as organization consultant for operating departments of the company.

He has been associated with General Electric and its affiliates in the U. S. and abroad for over 30 years, with the exception of a short period during World War II, when he was with Curtiss-Wright Corp. He has been engaged in GE design, marketing, and application engineering of a variety of electrical products and projects.

During the Korean war he was responsible, at General Electric's Evendale plant, Cincinnati, O., for the design engineering, development, prototype production and qualification of jet engines.

A U. S. citizen, Mr. de Ferranti was born in Brussels, Belgium, and spent

his boyhood in Sydney, Australia. He is a graduate in electrical engineering from Sydney Technical College.

Following graduation, he started his business career with the Australian General Electric Co. in Sydney. Later, he joined the British Thomson Houston Co. in England and transferred, after two years, to its associate, the General Electric Co., U.S.A.

Burpo Is Midwest Region Sales Head, Union Carbide

Howard L. Burpo Jr. has been appointed regional manager in the midwestern sales region of Union Carbide Plastics Co., division of Union Carbide Corp. According to the announcement by J. B. Knowles, manager - sales, Mr. Burpo, formerly assistant to the sales manager, will direct the sale of Bakelite brand polyethylene, styrene, phenolic, and epoxy resins and compounds.

P. W. Wood, who has been midwestern regional manager since November, 1958, will serve as product manager - polyethylene. He will be located in the company's New York City general sales office.

H. L. BURPO JR.

Mr. Burpo will be assisted by Harold A. Holz and William G. Westergan, assistant regional managers, and will be located in the Union Carbide company's office at 230 N. Michigan Ave., Chicago 1, Ill. (FInancial 6-3300).

Mr. Burpo graduated from Georgia Institute of Technology in 1941, receiving a bachelor of science degree in industrial management. After serving four years in the United States Navy as a lieutenant, he joined Union Carbide Plastics Co. In 1947, he was assigned as a technical sales representative, and in 1956 as eastern zone manager—film and sheeting. Two years later, he was named manager - agricultural products,

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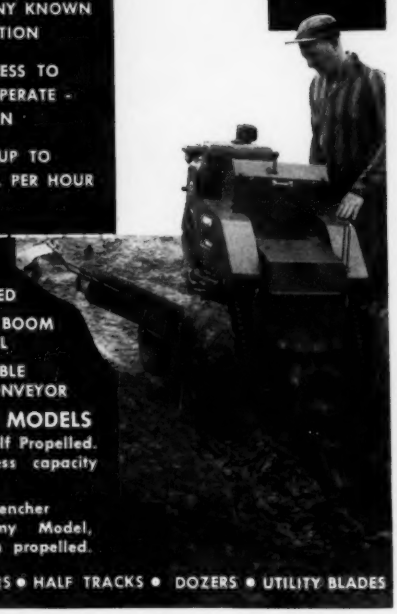

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and in 1959 he assumed his most recent position of assistant to sales manager.

Appoint L. H. Loehr Manager GD/E Electronic Data

The appointment of Lawrence H. Loehr as manager of electronic data procedures for General Dynamics/Electronics has been announced by Robison Clark, division controller.

Mr. Loehr will have responsibility for all systems and procedures at General Dynamics/Electronics involving the utilization of electronic data processing equipment.

L. H. LOEHR

He went to General Dynamics from the White Motor Co., Cleveland, Ohio, where he was manager of systems for five years. Earlier, he was a member of the industrial operations analysis staff of the U. S. Steel Corp., in Cleveland; and prior to that, was with Price, Waterhouse & Co., Milwaukee, Wis.

A native of New Holstein, Wis., Mr. Loehr was graduated from Marquette University, where he earned a bachelor's degree in accounting.

During World War II, he served in the U. S. Army Finance Division in India and Burma.

Wilcoxon Named Assistant Head, Leich Motor Vehicles

D. C. Gibson, president, has announced the appointment of Kenneth L. Wilcoxon as assistant manager of Leich's motor vehicle department.

In this position, Mr. Wilcoxon serves the automotive needs of the Independent telephone industry. He reports to R. J. Timko, manager of the motor vehicle department. Leich handles a line of automobiles, trucks, truck bodies, tires, and batteries.

KENNETH L. WILCOXON

Before joining Leich, Mr. Wilcoxon was employed by a construction company. He attended Bradley University, Peoria, Ill. and served in the Navy for two years.

Dialaphone Names Langland Head of Telephone Liaison

The appointment of George R. Langland as director of telephone company liaison for Dialaphone, San Mateo, Cal., was recently announced.

Mr. Langland, who has been associated with Dialaphone for the past seven years, is responsible for the company's promotional activities in the telephone industry, for training of sales and technical personnel, and for supervision of Dialaphone's service activities.

A native Californian, he graduated from Redwood City's Sequoia High School, and was associated with Dalmo Victor in plastics fabrication research before joining Dialaphone.

A. B. Chance Co. Buys Interest in Pitman Mfg.

The A. B. Chance Co., Centralia, Mo., manufacturer of telephone line equipment, has purchased a 49 per cent interest in Pitman Mfg. Co., Grandview, Mo., according to a joint announcement by N. A. Toalson, A. B. Chance Co. president, and R. F. Pitman, president of the firm bearing his name. While the two companies will retain separate identities, four members of the A. B. Chance Co. have been elected to the Pitman board of directors.

The increased capitalization will provide funds to continue expansion of Pitman's product line and production facilities, Mr. Pitman said. The firm manufactures truck-mounted hydraulic cranes and diggers for the construction and utility industries as well as hydraulic aerial personnel platforms

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2171	60 Cycles to 4 Kilocycles	30 Cycle or 50 Cycle Filter	−68 to +32dbm	± .5db −80 to +32dbm 300 Cycles to 4 Kilocycles	**30 CYCLE FILTER** 6db— 35 Cycles 60db—250 Cycles
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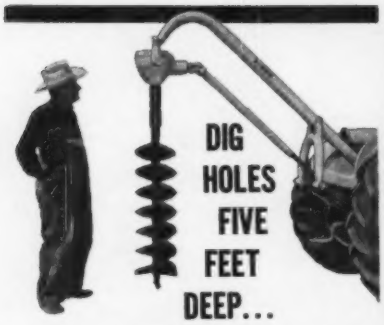

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AUTOMATIC ELECTRIC

JACK STRIPS	LAMP STRIPS	RELAYS
42428-EO	42431-F	Manual and
42428-AO	42431-C	Horizontal Types
42428-A4	42431-G	

STROMBERG-CARLSON

JACK STRIPS	LAMP STRIPS	RELAYS
#127 on 90-A	121 on 83	194-A and 193-BB
#127 on 89	121 on 89	on 105-L Mtg.
#128 on 97	121 on 81	
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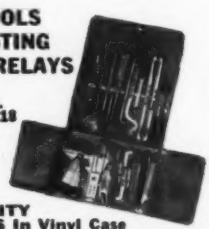
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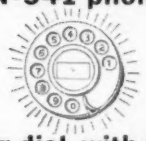
Item No. 1—North N-541 phones are now available with the industry's first Line Powered Lighted Dial!  **There's no extra cord to be plugged into an AC outlet. There is a softly glowing dial, with the light intensified when the handset is lifted. Location in the dark is positive and convenient—dialing is simple and easy.**

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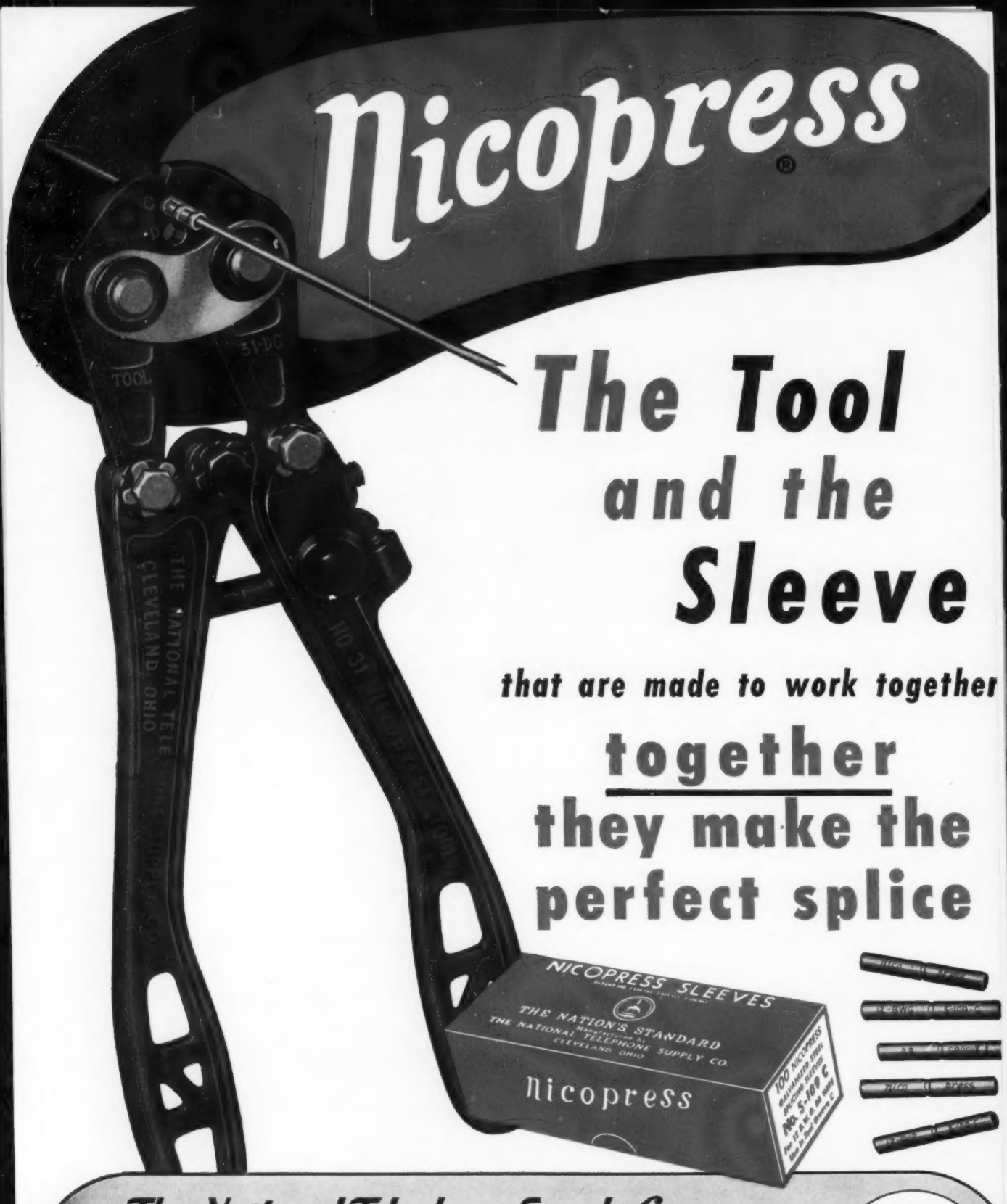

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